SONY

PORTABLE VIDEOCASSETTE RECORDER

BVW-35P



BETACAM SP

MAINTENANCE MANUAL Volume 1 3rd Edition Serial No. 11744 and Higher

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UPDATE INFORMATION

MODEL NAME REVISION NO. DATE BVW-35P (EK) Maintenance manual Vol.2

4th Edition Oct/ 10/89

Rev. No	S. No.	Action	Page			
E4	11744- 11838	Add	Addition of boards. (Board name; ENC-11P, DEC-49P, KY-110P)			
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- 1) "Rev. No." is the corresponding revised number of the service manual for the customer. El R1 means 1st Edition Revised 1.
 "Serial Number" is the serial number range which the Rev.No. in the left column covers.
- 2) The changed portions are indicated by doted line and/or "**" (double asterisk).
- 3) "N.A." in the serial number column means there is no machine covering this revision. The machine for the different market, e.g. Japan, may exist for this manual revision.

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- 16. SPARE PARTS AND FIXTURE

SECTION 1 TECHNICAL INFORMATION

1-1. SPECIFICATIONS

Mechanical

Weight

: 6.7 kg

Dimensions

: 296 x 140 x 348 mm (w/h/d) including projecting parts and controls

Operating position

: Both vertical and horizontal

Tape transport mechanism

: Betacam system

Video cassettes

: 1/2-inch Betacam, Betacam SP cassette

. Oxide tape

BCT-5K, BCT-10K, BCT-20K, BCT-30K or

equivalent

. Metal tape

BCT-5M, BCT-10M, BCT-20M, BCT-30M or

equivalent

Tape speed

: 101.5 mm/sec.

REC/PLAY time

: maximum 36 min. (With a BCT-30M video

cassette)

Fast forward time

: Less than 3.5 minutes (With a BCT-30M video

cassette)

Rewind time

: Less than 3 minutes (With a BCT-30M video

cassette)

Continuous Operating time

: Approx. 70 minutes with a fully charged

battery pack BP-90 when operated with a

BVP-5P video camera.

Connectors

VIDEO IN

: BNC x 1

CAMERA

: 26-pin multi x 1

VIDEO OUT 1, 2

: BNC x 1 in each

DUB/COMPONENT OUT

: 12-pin multi x 1

AUDIO IN CH-1, CH-2, CH-3, CH-4

: XLR, 3-pin, female x 1 in each

AUDIO OUT CH-1, CH-2, CH-3, CH-4

: XLR, 3-pin, male x 1 in each

 SC IN
 : BNC x 1

 TC IN
 : BNC x 1

 TC OUT
 : BNC x 1

EARPHONE : Stereo mini jack x 1
HEADPHONES : Stereo phone jack x 1

REMOTE : 9-pin multi x 1 (RS-422A)

UHF OUT : IEC-type standard aerial connector x 1

Operating temperature : 0°C to 40°C
Storage temperature : -20°C to +60°C

Operating humidity : Less than 85 % (relative humidity)

Electrical

Power requirements : DC12V

BP-90 battery pack (Ni-Cd, 3.5Ah), or two NP-1 battery packs (Ni-Cd, 1.5Ah), or two NP-1A battery packs (Ni-Cd, 1.7Ah) AC power source operation possible using the AC-500CE AC power adapter (optional)

the AC-500CE AC power adaptor (optional)

Power consumption : REC mode : 34 W (component REC mode : 30 W)

PLAY mode: 30 W STOP mode: 2 W

VIDEO

Video recording system

Luminance : FM

Chrominance : Compressed time division multiplex FM

Bandwidth

Luminance (50%) : Metal tape;

25 Hz to 5.5 MHz +0.5 dB, -3.0 dB

Oxide tape;

25 Hz to 4.0 MHz +0.5 dB, -6.0 dB

Chrominance (50%) : Metal tape and Oxide tape

25 Hz to 1.5 MHz +0.5 dB, -3.0 dB

Signal-to-noise ratio

Luminance : Metal tape; More than 48 dB

Oxide tape; More than 46 dB

Color difference : Metal tape; More than 48 dB

Oxide tape; More than 45 dB

K-factor (2T pulse)

: Metal tape; Less than 2 % Oxide tape; Less than 3 %

Y/C delay

: Metal tape and Oxide tape;

Less than 20 nsec

Low frequency non-linearity

Metal tape; Less than 3%

Oxide tape; Less than 4%

Input

VIDEO IN

: Composite, 1.0 Vp-p, 75 ohms
Advance Sync, 4.0 Vp-p, 75 ohms

CAMERA

: Composite, 1.0 Vp-p, 75 ohms

Component, Luminance 1.0 Vp-p, 75 ohms

Chrominance R-Y 0.7 $Vp-p^{*3}(100\% \text{ color bars})$ 75 ohms B-Y 0.7 $Vp-p^{*3}(100\% \text{ color bars})$, 75 ohms

SC IN

: 2 Vp-p + 1.0 V, 75 ohms, unbalanced

Output

VIDEO OUT 1, 2

: Composite, 1.0 Vp-p, 75 ohms, sync negative

DUB/COMPONENT OUT

: Luminance 1.0 Vp-p, 75 ohms, sync negative

Chrominance R-Y 0.7 $Vp-p^{*3}(100\% \text{ color bars})$, 75 ohms B-Y 0.7 $Vp-p^{*3}(100\% \text{ color bars})$, 75 ohms

UHF OUT

: for TV channel 30 to 38 (adjustable),

system 1/3 (selectable)

AUDIO

Audio recording system

: LNG; Bias

: AFM; FM

Frequency response:
*1
(20dB below peak level)

LNG

: Metal tape;

50 Hz to 15 kHz +1.5 dB, -3.0 dB

Oxide tape;

50 Hz to 15 kHz + 3.0 dB

AFM

: Metal tape;

20 Hz to 20 kHz +0.5 dB, -2.0 dB

Note: *1) peak level---AFM: +19VU, LNG: +8VU

- *2) refered to peak level, weighted CCIR 468-3, with Audio N.R.
- *3) The input/output level of a component signal conforms to the EBU N-10 standard.

Dynamic range:
AFM

Signal-to-noise ratio:

```
LNG
                             : Metal tape; More than 62 dB
                               Oxide tape; More than 58 dB
   AFM
                             : Metal tape; More than 68 dB
Distortion (at 1kHz):
                             : Metal tape; Less than 3 % (at peak level)
   LNG
                                           Less than 1.5% (at OVU level)
                               Oxide tape; Less than 3 % (at peak level)
                                           Less than 2% (at OVU level)
                             : Metal tape; Less than 3 % (at peak level)
   AFM
                                           Less than 0.5% (at 0VU level)
Cross talk (at 1kHz):
   LNG
                             : Metal tape and Oxide tape; Less than -55 dB
   AFM
                             : Metal tape; Less than -65 dB
Wow and flutter (DIN45507):
                             : Metal tape and Oxide tape; Less than 0.15 % rms
Depth erasure (at 1kHz)
   LNG
                             : Metal tape and Oxide tape; More than 65 dB
Input
  CAMERA
                             : -60/-20/+4 dB (selectable)
                               impedance more than 3 K ohms, balanced
  AUDIO IN CH-1, CH-2, CH-3, CH-4
                             : -60/-20/+4 dB (selectable)
                               impedance more than 3 k ohms, balanced
Output
  AUDIO OUT CH-1, CH-2, CH-3, CH-4
                            : +4 dBm (600-ohm load), balanced
  EARPHONE
                            : max. -20 dBs (8-ohm load), adjustable
  HEADPHONES
                            : max. -20 dBs (8-ohm load), adjustable
TIME CODE
Input (TC IN)
                            : 0.5 to 18 Vp-p, impedance more than
                              10 k ohms, unbalanced
Output (TC OUT)
                            : 2.2 Vp-p + 3 dB (600-ohm load), unbalanced
                              1.2 Vp-p + 3 dB (75-ohm load), unbalanced
Note: *1) peak level - AFM: +19VU, LNG: +8VU
```

*2) refered to peak level, weighted CCIR 468-3, with Audio N.R.

: Metal tape; More than 80 dB

1-2. PRINTED CIRCUIT BOARDS

Circuit information is provided below.

System	Board	Circuit function				
	BF-29	Video Input Level/Buffer				
	DEC-49P	Y/C Separator/Decoder				
	MDM-3P	Modulator/Demodulator				
	DL-13	1H Delay Line for DOC				
	DM-58A	Demodulator				
	DO-19	DO Detector				
	DUS-277	RF Switch				
	EQ-14	COS Equalizer				
	EQ-14A	COS Equalizer				
	FL-66	Filter				
	PA-60A	PB Amplifier				
	RF-16A	RF AGC				
	RG-24	+5V Regulator				
	TG-31	Timing Generator				
	VA-54	Video Amplifier				
	VRA-1	Video REC Amplifier				
	CEC-3P	CTDM/Expander				
VIDEO	CF-29	Comb Filter				
	CL-15	Clamper for DL-15 OUT				
		Signals				
	CL-16	Clamper for DL-15 IN				
		Signals				
	DL-14	1H Delay Line				
	DL-15	1/2H, 1H Delay Line				
	DL-17	1H Delay Line for CF				
	ED-18	Edge Detector				
	EQ-23	Delay Circuit				
	LM-15	Limiter for Pre-phaser				
	LM-16	Limiter for REC 100 %				
		CTDM signal				
	NR-18	Noise Canceller for PB				
		CTDM Signal				
	ENC-11P	Video Encoder/Y Pro				
		cessor				

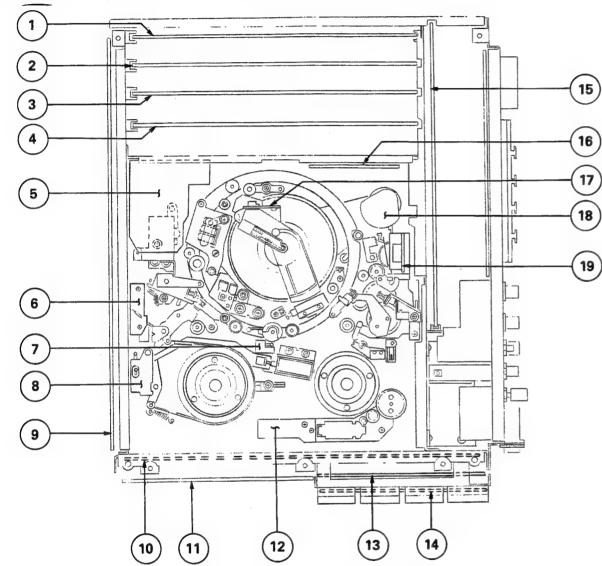
System	Board	Circuit function						
	MA-28	Mic Amplifier						
	MT-34	Meter Drive/Audio Level						
	VR-64	PB Level						
	AU-93P	Audio REC/PB Amplifier						
	AFM-3	FM Audio						
	AL-14	AGC/Limiter						
	AR-12P	REC Amplifier						
	CO-8	CONFI PB						
	DC-33	DUB Crosstalk Canceller						
AUDIO	NR-19	Noise Reduction						
	SG-137	REF Clock Generator						
	VA-68	AGC						
	MS-22	Monitor Amplifier/Monitor						
		Selector						
	CP-114	XLR OUT Amplifier						
	VR-63	Phone Level						
•	HP-36	Headphones/Earphone						
	CD-54	DC-DC Converter						
	DD-17V	DC-DC Converter						
	MTS-2	CH-4/Monitor Switch						
	ASW-7	Audio Front Switch						
	SV-94P	Servo System						
SERVO	SD-16P	Servo Driver						
	DR-63	Drum Motor						
TIME CODE	TC-45P	Time Code RIC/PB						
		Amplifier						
	KY-110P	Function Key/Firme Code						
	SY-110	System Control						
i	CS-22	SP Cassette-in Switch						
SYSTEM	DU-39	Eject Motor						
CONTROL	SW-24	Unthreading-end Switch						
	SW-203	Miss REC/Cassett e-in						
		Switch						
	SWC-3	Tension Regulator Switch						

System	Board	Circuit function				
	BC-14	Battery				
POWER	DC-DC	DC-DC Converter				
	CONV.					
	DC-35	DC IN/Diode				
	PSW-8	Power Switch Control				
	CN-185	CP Connection Board				
	CON-12	BNC Connector				
	DS-23	Dew Connection Board				
OTHER EX-150		Extension Board				
	MB-157	Mother Board				
	DE-19	Level Detector				
	PA-67P	RF REC/PB Amplifier				
	RM-54	9P Remote Control				
	RMD-1	RF Modulator				
	SR-41	Slip-ring				

1-3. LOCATION OF MAIN PARTS

1-3-1. Location of the Printed Circuit Boards

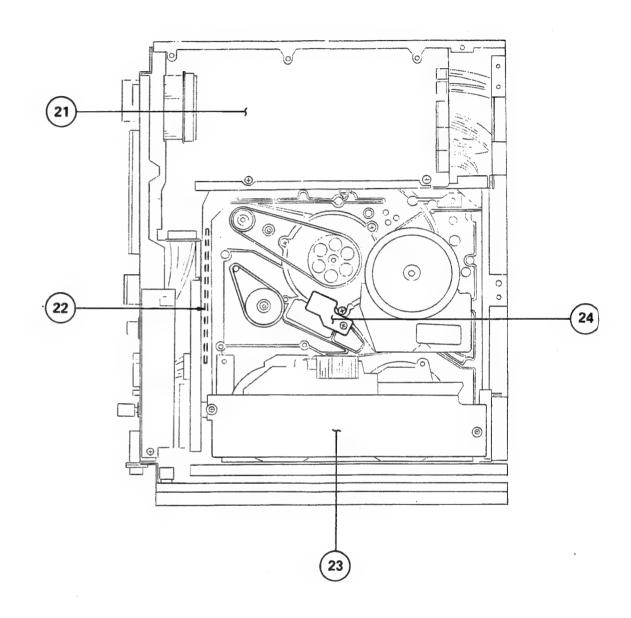
(TOP VIEW)



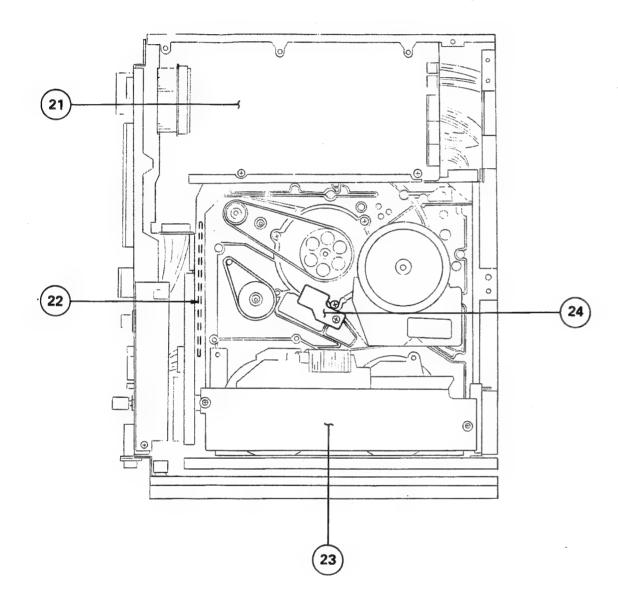
- 1 DEC-49P Board
- 2 CEC-3P Board (with CF-29, CL-15, CL-16,
 DL-14, DL-15, DL-17, ED-18, EQ-23, LC-11,
 LM-15, LM-16 and NR-18 Boards)
- 3 ENC-11P Board
- 4 MDM-3P Board (with DL-13, DM-58A, DO-19, DUS-277, EQ-14, EQ-14A, FL-66, PA-60A, RF-16A, RG-24, TG-31 and VA-54 Boards)
- 5 VRA-1 Board
- 6 SWC-3 Board
- 7 CS-22 Board
- 8 SW-203 Board

- 9 SV-94P Board
- 10 SY-110 Board
- 11 KY-110P Board
- 12 DU-39 Board
- 13 MT-34 Board (with VR-64 Board)
- 14 ASW-7 Board
- 15 AU-93P Board (with AFM-3, AL-14, AR-12P, CO-8, DC-33, NR-19, SG-137 and VA-68 Boards)
- 16 TC-45P Board
- 17 SR-41 Board
- 18 DR-63 Board
- 19 SW-24 Board

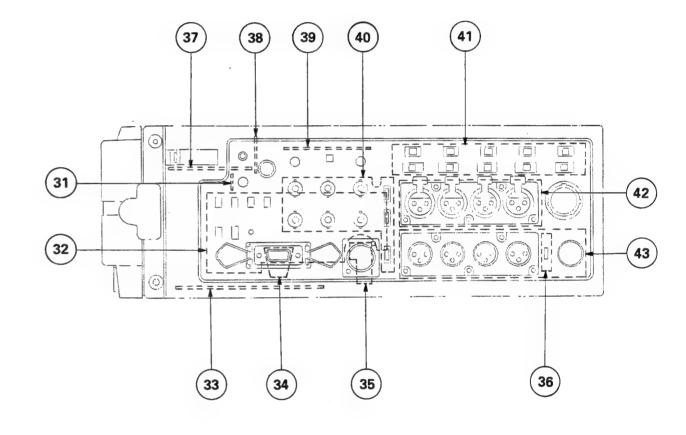
(BOTTOM VIEW)



- 21 MB-157 Board (with DE-19 Board)
- 22 BC-14 Board (installed in the Battery Case)
- 23 SD-16P Board
- 24 DS-23 Board



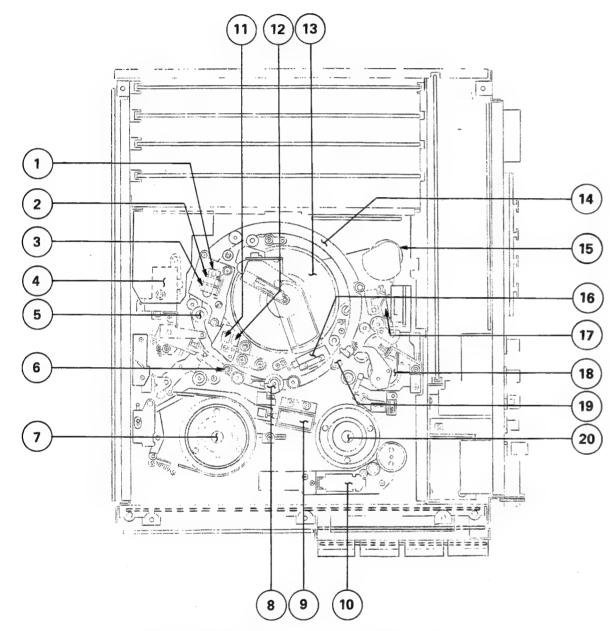
- 21 MB-157 Board (with DE-19 Board)
- 22 BC-14 Board (installed in the Battery Case)
- 23 SD-16P Board
- 24 DS-23 Board



- 31 VR-63 Board
- 32 MS-22 Board
- 33 PSW-8 Board
- 34 RM-54 Board
- 35 DC-35 Board
- 36 MTS-2 Board
- 37 HP-36 Board
- 38 RMD-1 Board 39 BF-29 Board
- 40 CON-12 Board
- 41 MA-28 Board
- . MA 20 DOALG
- 42 CP-114 Board
- 43 CN-185 Board

1-8

1-3-2. Location of the Main Mechanical Parts/Components (TOP VIEW)



- 1 Audio/Erase Head
- 2 Audio/TC Head
- 3 Audio/Confidence Head
- 4 Pinch Solenoid
- 5 Capstan Shaft
- 6 Tension Regulator Arm
- 7 Supply Reel Table
- 8 Pinch Roller

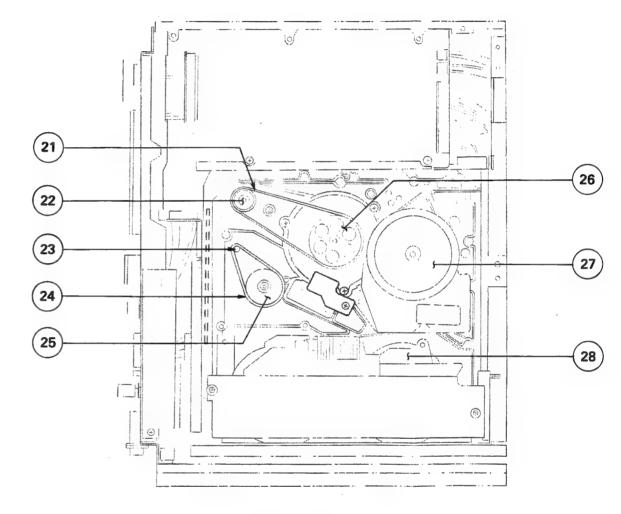
10 Eject Motor

9 Tension Solenoid

- 11 Full Erase Head
- 12 CTL Head
- 13 Head Drum
- 14 Threading Ring
- 15 Drum Motor
- 16 Eject Solenoid
- 17 Threading Motor
- 18 Gear Block
- 19 Slant Guide
- 20 Take-up Reel Table

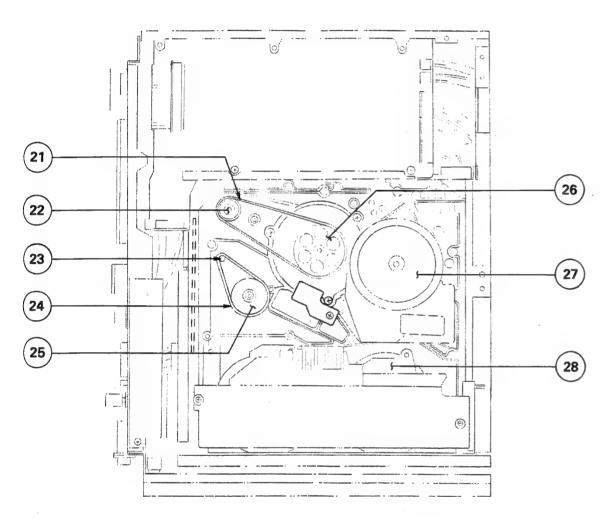
1-10

(BOTTOM VIEW)



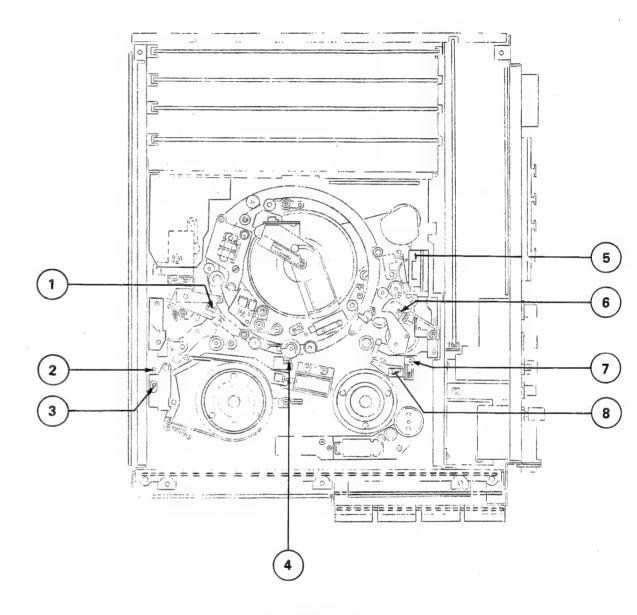
- 21 Drum Belt
- 22 D Motor Pulley
- 23 Threading Motor Pulley
- 24 Threading Motor Belt
- 25 Deceleration Pulley
- 26 Drum Pulley
- 27 Capstan Motor
- 28 Reel Motor

OTTOM VIEW)



- 21 Drum Belt
- 22 D Motor Pulley
- 23 Threading Motor Pulley
- 24 Threading Motor Belt
- 25 Deceleration Pulley
- 26 Drum Pulley
- 27 Capstan Motor
- 28 Reel Motor

1-3-3. Location of the Sensors and Switches



- 1 Tape End Sensor
- 2 Miss-REC Switch (for Metal tape)
- 3 Cassette-in Switch
- 4 Oxide/Metal tape Detection Switch
- 5 Unthread End Switch
- 6 Tape Beginning Sensor
- 7 Miss-REC Switch (for Oxide tape)
- 8 Cassette Lock Switch

1-4. CONNECTION CONNECTORS

When external cables are connected to the various connectors on the connector panel during maintenance, the hardware listed below (or equivalents) must be used.

Panel indication	Connection connector				
VIDEO IN	1-560-069-11				
VIDEO OUT 1/2	PLUG, BNC, male				
SC IN					
TC IN					
TC OUT					
AUDIO IN	1-508-084-00				
	Connector, XLR, 3P, male				
AUDIO OUT	1-508-083-00				
	Connector, XLR, 3P, female				
CAMERA	1-564-183-00				
	PLUG, 26P, male				
DC IN 12 V	1-508-362-00				
	Connector, XLR, 4P, female				
DUB/COMPONENT	1-560-995-00				
OUT	PLUG, 12P, male				
UHF OUT	1-508-459-00				
	AERIAL				
REMOTE	1-560-651-00				
	Connector (M), 9P				
	1-561-749-00				
	JUNCTION SHELL, 9P				

1-5. INPUT/OUTPUT SIGNAL OF THE CONNECTOR

INPUT

VIDEO

VIDEO IN : Composite, 1.0 Vp-p, 75 ohms

Advance Sync 4.0 Vp-p, 75 ohms

CAMERA : Composite, 1.0 Vp-p, 75 ohms

Component, Luminance 1.0 Vp-p
R-Y/B-Y 0.7 Vp-p

(100% color bars), 75 ohms

AUDIO

CAMERA : -60/-20/+4 dB, selectable

Audio channel 1/2/3/4 selectable impedance more than 3 k ohms,

balanced

CH-1, CH-2, CH-3 and CH-4

: -60/-20/+4 dB, selectable impedance more than 3 k ohms,

balanced

TC IN : 0.5 to 18 Vp-p, impedance,

more than 10 k ohms, unbalanced

SC IN : 2 Vp-p + 1.0 V, 75 ohms,

unbalanced

OUTPUT

VIDEO OUT 1, 2

: Composite, 1.0 Vp-p, 75 ohrns,

sync negative

DUB/COMPONENT OUT

: Luminance; 1.0 Vp-p, 75 ohms,

sync negative

Chrominance; R-Y/3-Y, 0.7 Vp-p (100% color bas)

75 ohms

AUDIO OUT

CH-1, CH-2, CH-3 and CH-4

: +4 dBm (600-ohm load), lalanced

EARPHONE : max. -20 dBs (8-ohm lost), Adjust-

able

HEADPHONES: max. -20 dBs (8-ohm lost), Adjust-

able

Note: *1) The input/output level of a cormponent signal conforms to the IBU N-10

standard.

1-6. SELECT SWITCH SETTING

Along with the select switches on the control panel and the connector panel, the switches listed below are on the circuit boards. These switches must be set according to operating conditions.

DEC-49P Board

S201: NOISE CANCELLER Switch

ON : Noise Canceller ON

OFF: Noise Canceller OFF

When the unit is shipped, NOISE CANCELLER Switch is set to the ON position.

ENC-11P Board

S1: C-MUTING Switch

ON : BLACK and WHITE

OFF : COLOR

When the unit is shipped, the C-MUTING Switch is set to the OFF position.

CEC-3P Board

S1 : C-NOISE CANCELLER Switch

ON : INPUT ON

OFF: INPUT OFF

When the unit is shipped, C-NOISE CANCELLER Switch is set to the ON position.

SY-110 Board

S1. S2 : VTR ID NO. SELECT Switch

BVW-35P can insert the ID No. to the user bit of the time code. These switches are used to set the ID No. When the unit is shipped, the VTR ID NO. SELECT Switches are set to "00".

TC-45P Board

S1: TIME CODE OUT MODE SELECT Switch

ON : GENE

OFF: AUTO

When S1 is in the ON position, the signal from the time code generator is always at the TC OUT connector.

When S1 is in the OFF position, the time signal is automatically selected between time code playback and generator time code according to the BVW-35P PB or REC/EE modes.

When the unit is shipped, this switch is set to the OFF position.

AU-93P Board

S2: AUDIO MIX Switch

When this switch is set to the MIX side, input signal in the CH-1 side and CH-2 is mixed and then recorded in the CH-1. When the unit is shipped, the AUDIO MIX

Switch is set to the CH-1 side/

1-7. SUPPLIED ACCESSORIES

Supplied BVW-35P accessories are as follows:

- 1. Antenna Select Switch x 1
- 2. Coaxial Cable with IEC-type standard aerial connector x 1
- 3. Carrying Case x 1
- 4. Extension Board (EX-150) x 1

1-8. OPTIONAL ACCESSORIES

The followings optional accessories are available.

- 1. AC Power Adaptor AC-500CE
- BP-90 or NP-1 2. Battery Pack
- 3. Battery Charger BC-210CE (for BP-90) and BC-1WA (for NP-1)

SECTION 2 PERIODIC CHECK AND MAINTENANCE

2-1. SYSTEM CONTROL OPERATION CHECK

It is recommended that the following check is performed daily before the operation. Note that the switches must be set according to the way the unit is used after the check.

2-1-1. Playback Function Check

Equipment

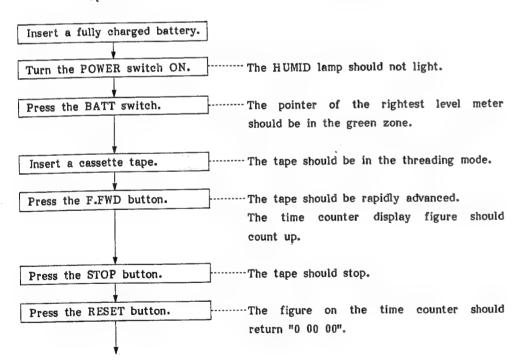
- (1) Recorded tape (Video, Audio CH-1/CH-2/CH-3/CH-4, Time code, FM Audio)
 - (Do not utilize an alignment tape.)
- (2) Video and audio monitor
- (3) Fully charged battery

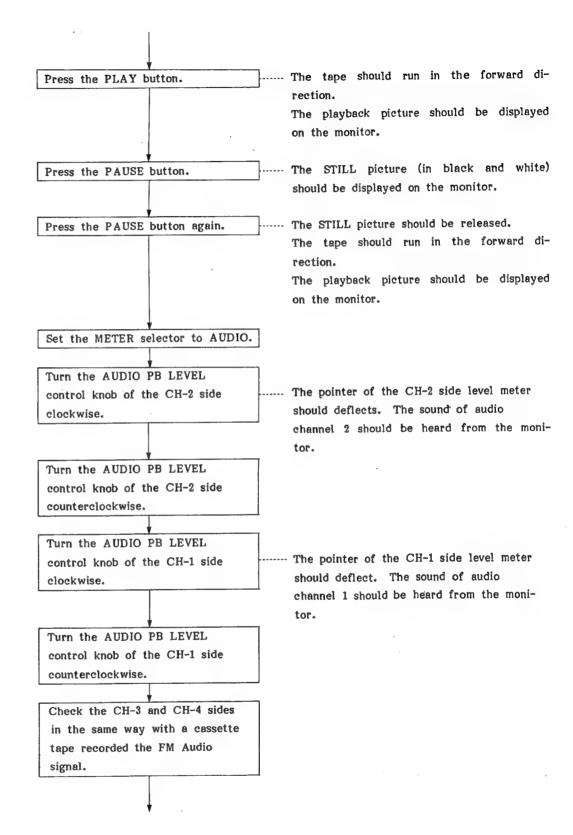
Switch Setting:

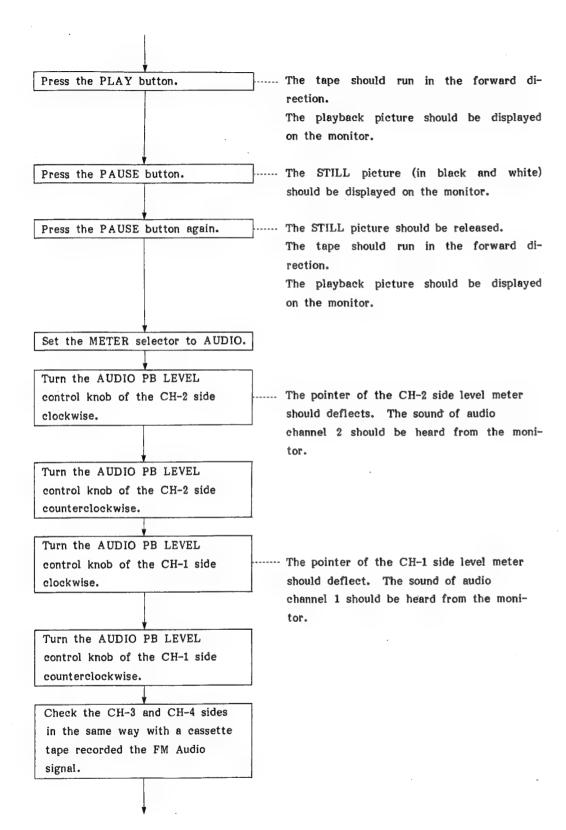
- (1) DISPLAY switch: CTL
- (2) MONITOR selector: CH-1 to CH-4; ON
- (3) TRACKING control: Clicked position

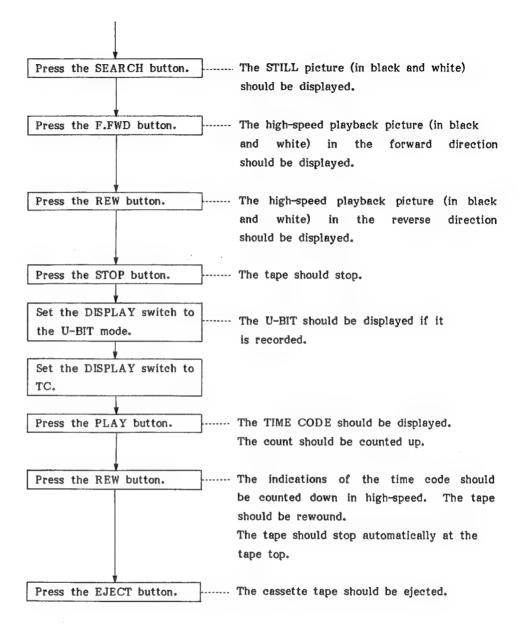
Operation

Check Point









2-1-2. REC Function Check in LINE Signal

Perform after the playback function check.

Equipment and setting: (1) Video Tape

- (2) Connect the video signal to VIDEO IN connector and the audio signal to AUDIO IN connector on the connector panel.
- (3) Video/Audio monitor

Switch setting

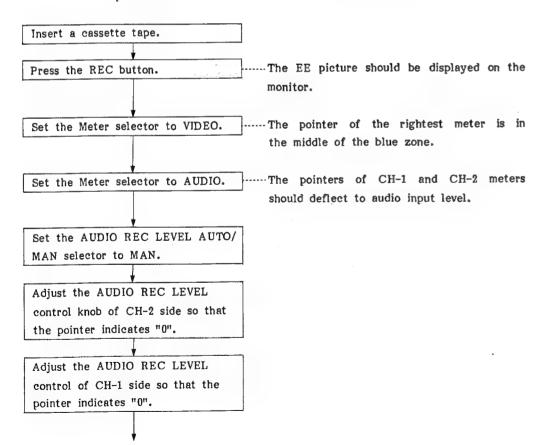
- : (1) DISPLAY switch : TC
 - (2) MONITOR selector: CH-1 to CH-4; ON
 - (3) AUDIO REC LEVEL AUTO/MAN selector : AUTO
 - (4) AUDIO IN selector: LINE
 - (5) AUDIO IN level selector: Set the input level
 - (6) VIDEO IN selector: LINE
 - (7) F-RUN/R-RUN selector: R-RUN

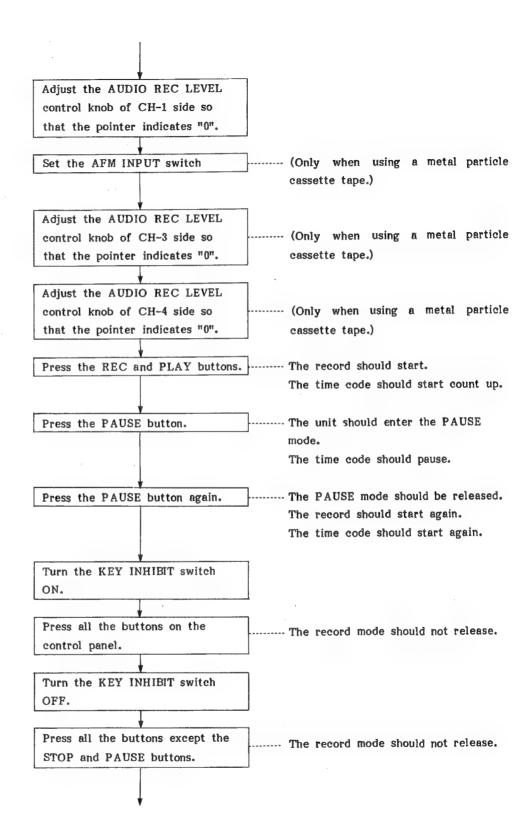
(U-BIT should be set the

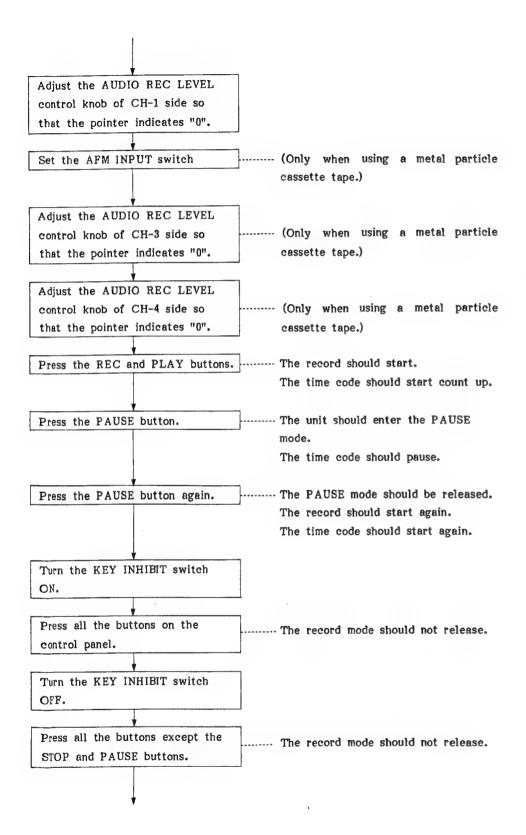
suitable value.)

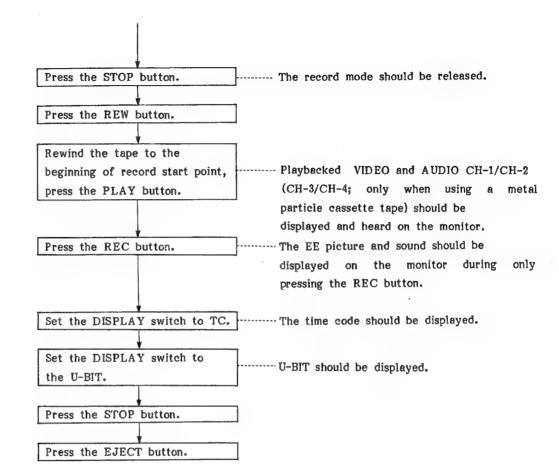
Operation

Check Point









2-1-3. Record Function Check in CAMERA Signal

Equipment

- : (1) Video camera (Connect the 26 P connector.)
 - (2) Video tape
 - (3) Video/audio monitor

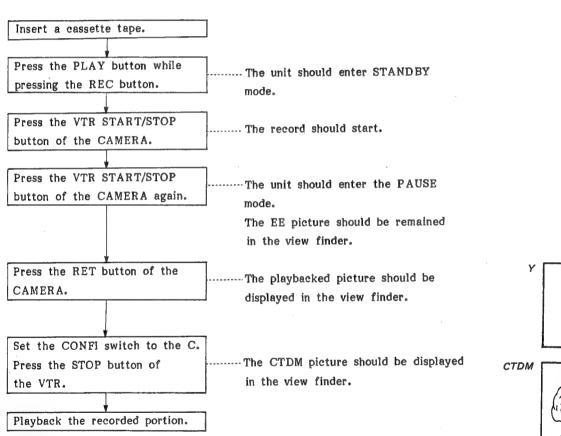
Switch setting

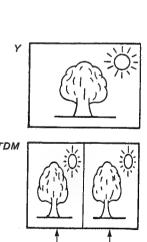
Operation

- : (1) DISPLAY switch : CTL
 - (2) MONITOR selector: CH-1 to CH-4 ON
 - (3) AUDIO REC LEVEL AUTO/MAN selector: AUTO

Check Point

- (4) AUDIO IN selector: CAMERA
- (5) VIDEO IN selector: CAMERA
- (6) CONFI switch: Y





2-1-4. Audio Dubbing Function Check

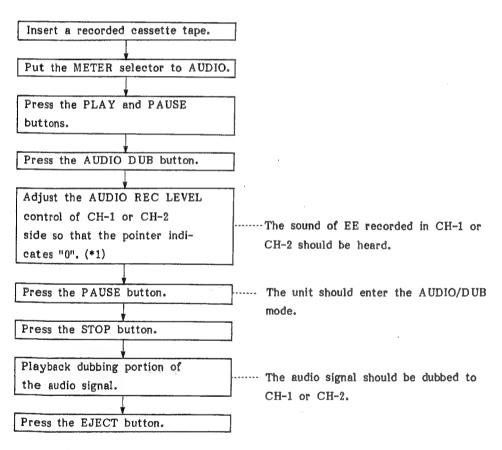
- Equipment and setting: (1) Recorded tape (Do not utilize an alignment tape.)
 - (2) Connect the Audio signal to AUDIO IN CH-1 and CH-2.
 - (3) Video/Audio monitor

Switch setting

- : (1) DISPLAY switch : CTL
 - (2) MONITOR selector: CH-1/CH-2; ON
 - (3) AUDIO REC LEVEL AUTO/MAN selector : MAN
 - (4) AUTO IN selector: LINE
 - (5) DUB switch: CH-1 or CH-2

Operation

Check Point



*1

Adjust the AUDIO REC LEVEL of the channel selected with the DUB switch. When checking the both channels, adjust one by one.

Checking procedure:

- (a) Turn the PAUSE button ON/OFF. Repeat the AUDIO dubbing in both channel.
- (b) Change the channel with the DUB switch during the dubbing, and check that the audio is dubbed in both CH-1 and CH-2.

2-2. MAINTENANCE

It is recommended that the following periodic check and maintenance schedule be employed in order to obtain maximum performance and longer tape life from the BVW-35P.

): Cl	eanin	g	♦	: Che	ck • : Replacement
Operating Hours (H)						25.00	2000			_
Item	Replacement Part No.	300	1000	1900	2000	2000	3000	3500	4000	Remarks
Cleaning of the tape movement area.		0	0	0	0	0	0	0	0	Perform whenever repair work is attempted.
Cleaning or replacement of the threading motor belt.	3-676-303-00	0	0	0	•	0	0	0	•	
Cleaning or replacement of the drum belt.	3-719-123-01	0	0	0	•	0	0	0	•	
Cleaning or replacement of the pinch roller.	X-3676-031-0	0	0	0	•	0	0	0	•	
Cleaning or replacement of the upper drum ass'y.	A-6762-334-A	0	•	0	•	0	•	0	•	Life of the video heads are affected extensively by operating ambient condition.
Check of the FWD back tension (Replacement of the brake band).	X-3682-811-0	-	♦	-	♦	_	•	-	\$	

2-2-1. Digital Hours Meter

The digital hours meter is located on the connector panel. This hours meter has four display mode. The accumulated elapsed operation time or number of operations will be displayed for every mode. You should periodically inspect the system based on the hours meter.

Note: The hours meter has a built-in battery which should be replaced every five years.

1. Display mode

- (1) T1: OPERATION METER mode
 Displays accumulated time that the unit has been turned ON.
- (2) T2: DRUM RUNNING METER mode
 Displays accumulated rotation time of the drum in the THREADING END mode
 (except the SAVE mode).
- (3) T3: TAPE RUNNING METER mode

 Displays accumulated tape running time in the F.FWD, REW, PLAY, SEARCH, REC

 mode (but not the STILL mode.)
- (4) CT: THREADING/UNTHREADING COUNTER mode
 Displays accumulated number of threading and unthreading operations.
 - . T1, T2, and T3

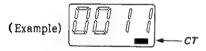
These mode display the accumulated time. The actual operation time is equal to the displayed value multiplied by 10.



This display indicates 110 hours 00 minutes 00 seconds to 119 hours 59 minutes 59 seconds (up to a maximum of 99999 hours 59 minutes 59 seconds can be displayed.)

· CT

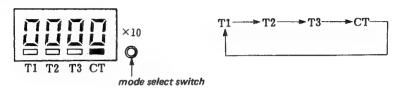
This mode displays the number of operations instead of the time. The actual number of operations used is equal to the displayed value multiplied by 10.



This display indicates between 110 and 119 operations.

2. Mode selection

When the mode select switch is pressed, the display rotates in the sequence shown below.



When the mode is set, the mode display bar in the designated mode lights or blinks. The VTR operation status at that time is described below.

Mode	Lights	Flashes
T1	. When the power is turned off.	. When the power is turned on.
Т2	. When the power is turned off. . When the power is turned on in a mode other than THREADING END mode.	. When the drum is rotating in the THREADING END mode.
Т3	 When the power is turned off. When the power is turned on in a mode other than FF, REW, PLAY, or SEARCH mode. 	. When the tape is running in the FF, REW, PLAY, or SEARCH mode.
СТ		. When the power is turned on or off.

2-3. MAINTENANCE AFTER REPAIRS

Perform the following maintenance after repairs regardless of the unit operating hours.

- 1. Video heads and stationary heads cleaning. (Refer to Section 2-4-1 to 2-4-3.)
- Tape movement area cleaning. (Refer to Section 2-4-4.)

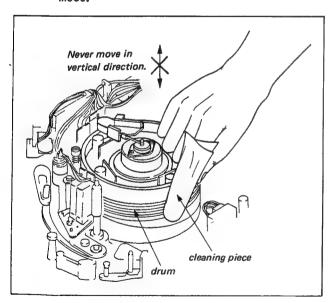
2-4. CLEANING PROCEDURE

Perform the cleaning as the following procedure. After the cleaning, insert a cassette tape after the cleaning fluid evaporate completely.

2-4-1. Video Head

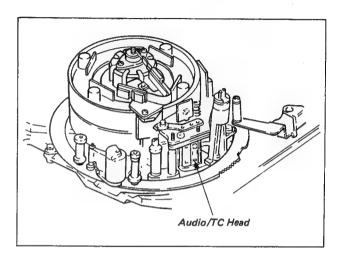
While pressing the cleaning piece moistened with cleaning fluid lightly, and turn the drum slowly by hand.

- Note: 1. Never move the cleaning piece in the vertical direction of the head tip in cleaning.
 - 2. Perform the cleaning in the power OFF mode.



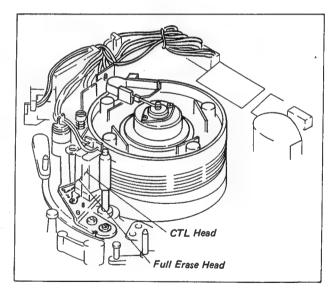
2-4-2. Audio/TC Head

Clean with the cleaning piece moistened with cleaning fluid.



2-4-3. CTL/Full Erase Head

Clean with the cleaning piece moistened with cleaning fluid.

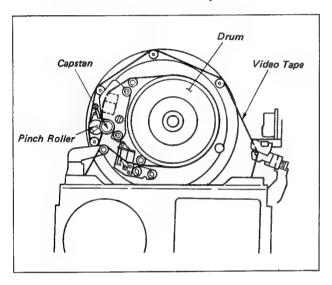


2-4-4. Tape Movement Areas

Wipe the tape bearing surface as shown in the following figure (of the tape guides, drum, capstan and the pinch roller) with a piece of cleaning piece moistened with cleaning fluid.

Note: Do not clean the surface of the condensation sensor on the slant chassis with cleaning cloth moistened with the cleaning fluid.

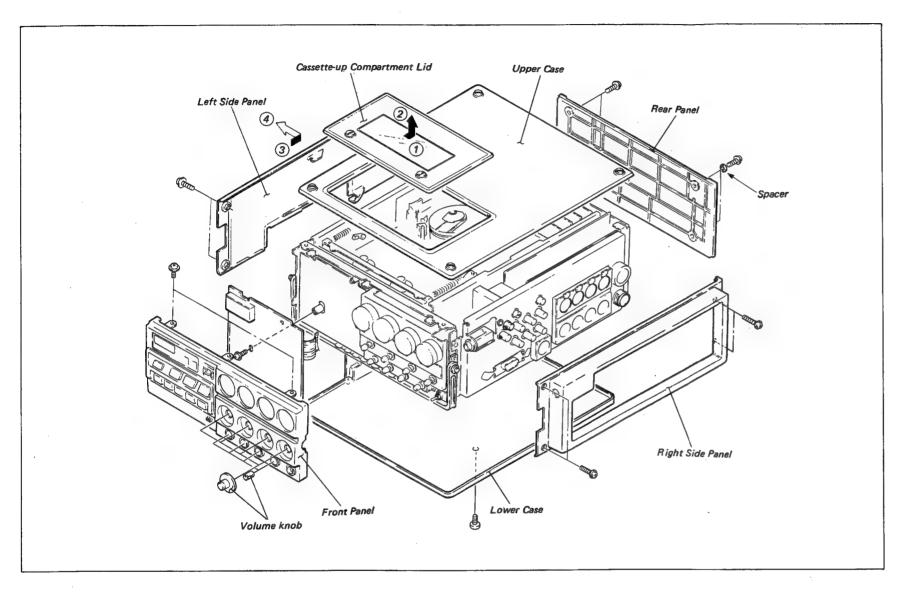
Clean the surface with dry cloth.





SECTION 3 SERVICE INFORMATION

3-1. REMOVAL OF THE CABINET





(1) Loosen the four fixing screws, and remove it. (The fixing screws cannot be detached since they uses retainers on the Upper Case.)

Cassette-up Compartment Lid

- (1) Loosen the two fixing screws of the Cassetteup Compartment Lid. (The fixing screws cannot be detached since they uses retainers on the Cassette-up Compartment Lid.)
- (2) Move the Cassette-up Compartment Lid in the direction of the arrows 1 and 2.

NOTE: When installing, move the Cassette-up Compartment Lid in the opposite direction of the arrows 1 and 2 so that the projection of the Cassette-up Compartment is inserted into the hole of the Lid.

Left Side Panel

- (1) Remove the Upper Case and the Lower Case.
- (2) Remove the four fixing screws of the Left Side Panel.
- (3) Remove the Left Side Panel in the direction of the arrows (3) and (4).

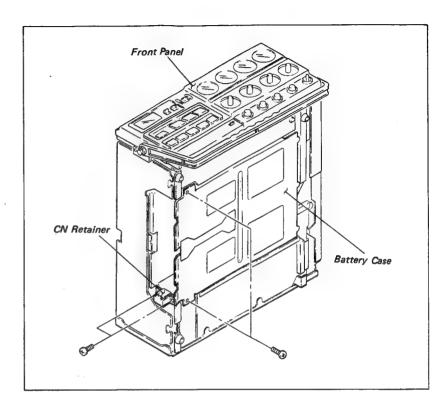
Right Side Panel

- (1) Remove the Upper Case.
- (2) Remove the four fixing screws of the Right Side Panel.

Rear Panel

- (1) Remove the Upper Case, Left Side Panel and the Lower Case.
- (2) Remove the four fixing screws of the Rear

NOTE: The two spacers are installed to the left of the Rear Panel. Be sure not to lose these spacers.



Front Panel

- (1) Remove the Control Knobs and Upper Case.
- (2) Remove the upper side three fixing screws of the Front Panel. (At this time, remove the fixing screw of front below side of the Right Side Panel.)

Lower Case

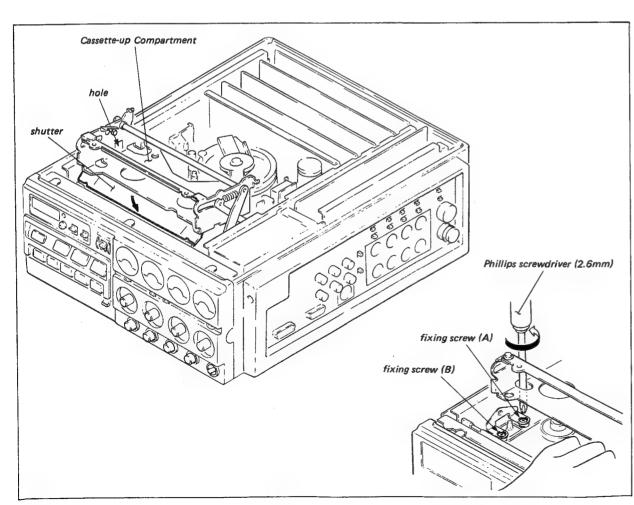
(1) Remove the four fixing screws of the Lower Case.

Battery Case

- (1) Remove the Lower Case and Left Side Panel.
- (2) Remove the two fixing screws of the CN retainer.
- (3) Remove the two fixing screws of the Battey
 Case.
 - NOTE: When installing, perform the revene procedures. Install the lug terminal for ground with the Battery Case.

3-2. REMOVAL OF THE CASSETTE-UP COMPARTMENT

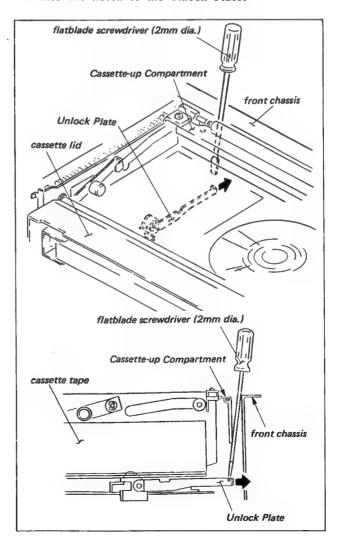
- (1) Remove the Cassette-up Compartment Lid. (Refer to Section 3-1.)
- (2) Turn ON the power, push the EJECT button, and put the Cassette-up Compartment into the up state.
- (3) Insert a phillips screwdriver (2.6 mm) into the left hole of the Cassette-up Compartment as shown in the figure, and loosen the fixing screw (A) as shown in the detailed view. The fixing screws cannot be detached since they uses retainers on the Cassette-up Compartment.
- (4) Loosen the fixing screw (B) as shown in the detailed view, while pushing the Shutter in the direction of the arrow.
- (5) Loosen the right side fixing screws in the same manner. The Cassette-up Compartment can be removed from the chassis.



3-3. CANCELLATION OF THE LOCK OF THE CASSETTE-UP COMPARTMENT WITHOUT POWER SUPPLY

Generally, the Cassette-up Compartment is unlocked and is put into the up state by turning the power ON and pushing the EJECT button. However when the power supply is not available, or when the Cassette-up Compartment does not rise up, the Cassette-up Compartment will be put into the up state as following steps.

- (1) Remove the Cassette-up Compartment Lid and Upper Case. (Refer to Section 3-1.)
- (2) Insert a flatblade screwdriver (2 mm dia.) between the front chassis and the Cassette-up Compartment, and insert the end of the driver into the notch of the Unlock Plate.



(3) Move the flatblade screwdriver (2 mm dia.) in the direction of the arrow while holding down the Cassette-up Compartment by hand. Move the Unlock Plate in the direction of the arrow, and then cancele the lock.

3-4. SPARE PARTS

- The shaded and A -marked components are critical to safety.

 Replace only with the same components as specified.
- (2) Replacement parts supplied from the Sony Parts
 Center will sometimes have a different shape
 and outside view from the parts which are used
 in the unit. This is due to "accommodating the
 improved parts and/or engineering changes" or
 "standardization of genuine parts".

 This manual's exploded view and electrical spare
 parts lists indicate the part numbers of "the
 present standardized genuine parts."

 Regarding engineering part changes in our
 engineering department, refer to Sony service
 bulletins and service manual supplements.
- (3) The parts marked with "s" in the SP column of the exploded views and electrical spare parts list are normally stocked for replacement purposes. The parts marked with "o" in the SP column are not normally required for routine service work. Orders for parts marked with "o" will be processed, but allow for additional delivery time.

3-5. NOTES WHEN SERVICING

. Maintenance of the Printed Circuit Board in the Rotary Upper Drum

The playback pre-amplifier for the video signal, the PA-67 Board are installed on the Rotary Upper Drum.

The dynamic balance of the entire Rotary Upper Drum is perfectly adjusted in the state that the PA-67 Board is installed. Therefore, the PA-67 Board should not be removed from the Rotary Upper Drum nor should the electric parts on the printed board be installed or removed. (Never perform solder to remove or install.) When the PA-67 Board fails, replace the entire Rotary Upper Drum. If the PA-67 Board is removed, the dynamic balance still be out of specification. Jitter will be increase, and the servo will be unstable.

. Micro Switch

The micro switches (1-571-064-11) are mounted on the both SW-203 (Metal Miss REC Ass'y) and CS-22 (C Detection SW Ass'y) Boards. These micro switches do not work correctly if they are heated too much. Therefore, be careful of the following in replacement.

Use n 18W soldering iron.

Temperature should be below 300°C.

Solder within 3 seconds.

3-6. OPERATION OF THE UNIT WITHOUT INSTALLING A CASSETTE TAPE

The following procedures are described without installing the Cassette-up Compartment.

1. Threading

- (1) Turn the power ON.
- (2) Keep pressing down the cassette-in switch until the threading ring stops its rotation. The unit is put into the threading completion mode.

2. PLAY

 Press the PLAY button in the threading completion mode. The unit is put into the PLAY mode.

3. F.FWD

 Press the F.FWD button in the threading completion mode. The unit is put into the F.FWD mode.

4. REW

- (1) Press the REW button in the threading completion mode. The unit is put into the REW mode.
- (2) When putting the unit into the STOP mode, press the STOP button.

5. SEARCH

FWD SEARCH

(1) Press the F.FWD and SEARCH buttons in the threading completion mode. The unit is put into the FWD SEARCH mode.

REV SEARCH

- (1) Press the REW and SEARCH buttons into the threading completion mode. The unit is put into the REV SEARCH mode.
- (2) When putting the unit into the STOP mode, press the STOP button.

6. Unthreading

(1) Press the EJECT button. The threading ring rotates in the clockwise direction.

3-7. CASSETTE TAPE REMOVAL PROCEDURE WHEN TAPE SLACK IS ACTIVATED AND WHEN NORMAL EJECTION IS NOT POSSIBLE

Tape slack in the REC, F.FWD or playback mode is detected with the reel rotation detector of the take-up reel table. If the take-up reel table rotation is stopped more than about 150 msec. by any reason in the REC or playback mode, the unit detects the tape slack. The unit stops all mode work to avoid tape damage. If the take-up reel table rotation is stopped more than about 600 msec. in the UNTHREADING mode, the unit detects the tape slack in the REC and playback mode. The unit stops all mode work.

If the take-up reel table rotation is stopped more than about 600 msec. in the FWD SEARCH mode (only more than x1/4 speed), the unit detects the tape slack. The unit stops all mode work.

In this case, the cassette tape can be removed from the unit by the following procedures. Locate the cause of the trouble and remedy the problem.

When the tape slack is detected.

The case of the cause of tape slack is in the take-up reel table.

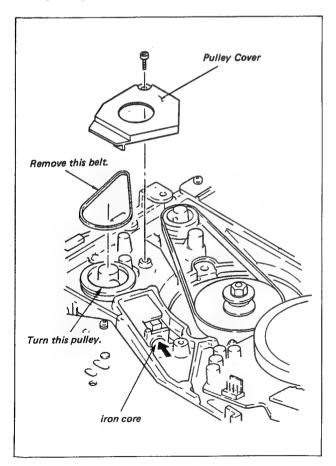
- (1) Turn the power OFF.
- (2) Remove the Upper Case. (Refer to Section 3-1.)
- (3) Turn the power ON once. Check as soon as possible that the Threading Ring rotates in the unthreading direction (clockwise direction) and the tape is taken up to the take-up reel table at the same time. If it is not to meets the both conditions, turn the power OFF quickly.
 - (i) When the Threading Ring does not rotate in the unthreading direction, perform the tape removal procedures (1) to (7).
 - (ii) When the Threading Ring rotates in the unthreading direction but the tape is not taken up to the take-up reel table, perform the tape removal procedures (6) and (7).

The case of the cause of tape slack is not in the take-up reel table.

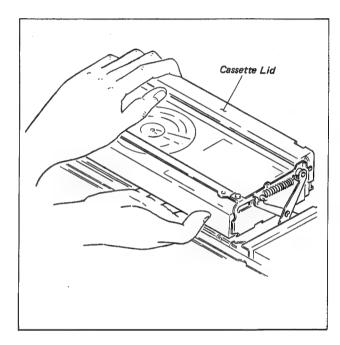
(1) Press the EJECT button many times.

Tape removal procedure:

- (1) Remove the Lower Case, Upper Case and Cassette-up Compartment Lid. (Refer to Section 3-1.)
- (2) Remove the two fixing screws, remove the Battery Case and connector.
- (3) Remove the Pulley Cover and the belt as shown in the figure.
- (4) Turn the pulley 3 to 4 turns in the clockwise direction viewing from back side of the unit, while pushing the core of the solenoid as shown in the figure in the direction of the arrow by hand.
- (5) Release the finger from the core, and turn the pulley in the clockwise direction until the threading ring comes in the fully unthreading position.
- (6) While holding down the Cassette-up Compartment Lid by hand, cancel the lock of the Cassetteup Compartment as Section 3-3.



- (7) Hold the Cassette Lid so that it does not close, and rise up the Cassette-up Compartment slowly. Insert a hand under the Cassette-up Compartment, and turn the Reel to rewind the loose tape.
- (8) Close the Cassette Lid, and remove the cassette tape.



3-8. TAPE PROTECTION

The VTR has various detection circuits for tape protection. These detection circuits are described here for each mode.

(1) During threading

When the VTR is put into the following states during the threading mode, the protection circuit detects tape slack if it occurs.

The SLACK LAMP lights, and the threading operation stops.

- When the threading end switch does not turned ON after 10 seconds from the driving current flows to the threading motor.
- When the unthreading end switch does not turned OFF after 10 seconds from the driving current flows to the threading motor.
- When the drum rotation stops during the threading mode and does not generate the DRUM ROTATE signal.

(2) During F.FWD/FWD-SEARCH

When the VTR is put into the following states during the F.FWD or FWD-SEARCH mode, the protection circuit detects tape slack if it occurs.

The SLACK LAMP lights, and the F.FWD or FWD-SEARCH mode operation stops.

- . When the take-up reel table rotation stops.
- When the drum rotation stops and does not generate the DRUM ROTATE signal.

(3) During REW/REV-SEARCH

When the VTR is put into the following states during the REW or REV-SEARCH mode, the protection circuit detects tape slack if it occurs.

The SLACK LAMP lights, and the REW or REV-SEARCH mode operation stops.

- · When the supply reel table rotation stops.
- When the drum rotation stops and does not generate the DRUM ROTATE singal.

(4) During PLAY

When the VTR is put into the following states during the PLAY mode, the protection circuit detects tape slack if it occurs.

The SLACK LAMP lights, and the PLAY mode operation stops.

- . When the take-up reel table rotation stops.
- . When the drum rotation stops and does not generate the DRUM ROTATE signal.
- . When the capstan rotation stops and does not generate the CAPSTAN ROTATE signal.

(5) During STOP-STANDBY ON

When the VTR is put into the following states during the STOP-STANDBY ON mode, the protection circuit detects tape slack if it occurs.

The SLACK LAMP lights, and the STOP-STAND-BY ON mode operation stops.

- . When the drum rotation stops and does not generate the DRUM ROTATE signal.
- When the capstan rotation stops and does not generate the CAPSTAN ROTATE signal.

(6) During PLAY-PAUSE

- . When the drum rotation stops and does not generate the DRUM ROTATE signals.
- (7) During REC-PAUSE (Except the SAVE mode) When the VTR is put into the following states during the REC-PAUSE mode, the protection circuit detects tape slack if it occurs. The SLACK LAMP lights, and the REC-PAUSE operation stops.
 - . When the drum rotation stops and does not generate the DRUM ROTATE signal.

(8) During unthreading

When the VTR is put into the following states during the unthreading mode, the protection circuit detects tape slack if it occurs.

The SLACK LAMP lights, and the unthreading mode operation stops.

- . When the take-up reel table rotation stops.
- . When the UNTHREAD END SW does not turn ON after 10 seconds from the driving current flows to the unthreading motor.

(9) When mode change from each mode to STOP mode.

When the VTR is put into the mode change from each mode to STOP mode, the tape reverses. Then when the VTR is put into the following states, the protection circuit detects tape slack if it occurs.

The SLACK LAMP lights and the tape reverse operation stops.

- . When the REVERSE STATUS signal of the capstan does not generate.
- (10)When the POWER switch turns ON. (Except tape end state in the threading completion mode.) When the POWER switch turns ON, the VTR is put into the following state. The protection circuit detects tape slack if it occurs. The SLACK LAMP lights, and the mode change

The SLACK LAMP lights, and the mode change operation to the STOP mode stops.

- . When the drum does not rotate and does not generate the DRUM ROTATE signal.
- . When the REVERSE STATUS signal of the capstan does not generate.
- . When the tension regulator switch does not turn ON.

3-9. TROUBLE JUDGEMENT FUNCTION

 $\ensuremath{\mathsf{BVW-35P}}$ provids the following trouble judgement function.

TROUBLE CAUSE	BATT LCD	SLACK LCD	HUMID LCD
DRUM ROTATE signal does not generate.	0		
CAPSTAN ROTATE signal does not generate.		0	
TENREG SW does not turn ON.	0	0	
TENREG SW does not turn OFF.	0	0	
T-FG/S-FG pulse do not generate.			0
CAPSTAN REV STATUS signal does not supply.	0		0
Does not put into THREAD END.		0	0
Does not put into UNTHREAD END.		0	0
CASSETTE LOCK SW does not turn ON in the EJECT mode.	0	0	0

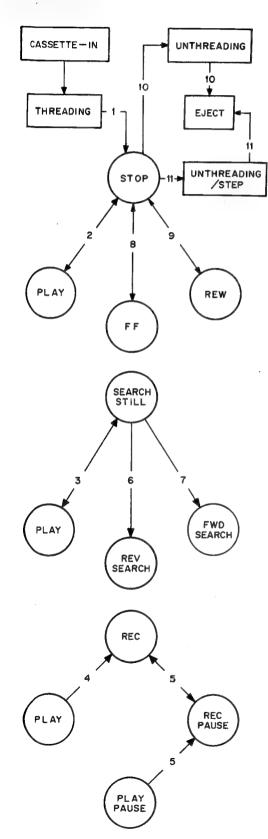
(1) The cause and mode of SLACK are displayed on the LEDs on the Front Panel as follows; When the SLACK occurs, press the STOP button after trouble occurs.

MODE	PLAY LED	REC LED	DUB LED	FF LED	REW LED	SEARCH LED	PAUSE LED	EJECT LED
PLAY	0	_	-	_	_	_	_	_
DUB PLAY	0	_	0	_	_	_	_	_
REC PLAY	0	0	_	_	_	-	_	_
FF	-	_	_	0	_	_	_	_
REW	_	_	_	_	0		_	_
FWD SEARCH	_	_	_	0	_	0	_	_
REV SEARCH	BUNG-	_	_	_	0	0	_	_
PLAY PAUSE	0	_	_	_	_	_	0	_
DUB PAUSE	0	_	0	_	_	_	0	_
REC PAUSE	0	0	_	_	_	_	0	_
FWD SEARCH PAUSE	arten.	_	_	0	_	0	0	_
REV SEARCH PAUSE	_	_	-		0	0	0	_
STILL	_		_	_	_	0	_	_
STOP		-	-	_	_	_	_	_
EJECT			_	_	_	_	-	0

3-10. FIXTURE

Part Number	Description	For Use
J-6001-820-A	Drum Eccentricity Gauge (3)	
J-6001-830-A	Drum Eccentricity Gauge (2)	Hanna danna anantaista di dan di dan
J-6001-840-A	Drum Eccentricity Gauge (1)	Upper drum eccentricity adjustment
J-6087-000-A	Drum Eccentricity Gauge (5)	
J-6031-840-A	Multi Connector Cable	Video system alignment
J-6080-008-A	Cassette Reference Plate	Reel table adjustment
J-6080-013-A	Dihedral Adjustment Screw	Video head dihedral adjustment
J-6080-029-A	Small Mirror for Adjustment	Video tracking adjustment
J-6080-030-A	Spare Mirror	video tracking adjustment
J-6152-450-A	Wire Clearance Gauge	Clearance check
J-6190-800-A	Tension Regulator Slantness Check Tool	Tension regulator slantness adjustment
	PB Amplifier Tool	Video tracking, CTL head, switching
J-6331-120-A	PB Ampitter 1001	position alignments
Pending	VISC Doubler (EW224)	Video system alignment
Y-2031-001-0	Cleaning Fluid	Cleaning
2-034-697-00	Cleaning Piece	Creating
3-702-390-01	Eccentricity Driver (4 mm dia.)	TC head position adjustment
7-732-050-20	Tension Scale (50g full scale)	Back tension adjustment
8-960-096-51	Alignment Tape, CR-2-1B PS	Video tracking tape for recorder
8-960-096-86	Alignment Tape, CR8-1B PS	Audio system alignment (metal tape)
8-960-096-91	Alignment Tape, CR5-1B PS	Video and audio AFM system alignment (metal tape
8-960-098-02	Alignment Tape, CR2-1PS	Video tracking tape for player
96-0098-44	Alignment Tape, CR5-2A PS	Video and servo alignments (oxide tape)
96-0098-45	Alignment Tape, CR8-1A PS	Audio and servo alignments (oxide tape)
9-911-053-00	Thickness gauge	Clearance check
Standard Products	Head Demagnetizer (HE-4)	Head demagnetize

3-11. TIMING CHART TRANSITION OF MODE

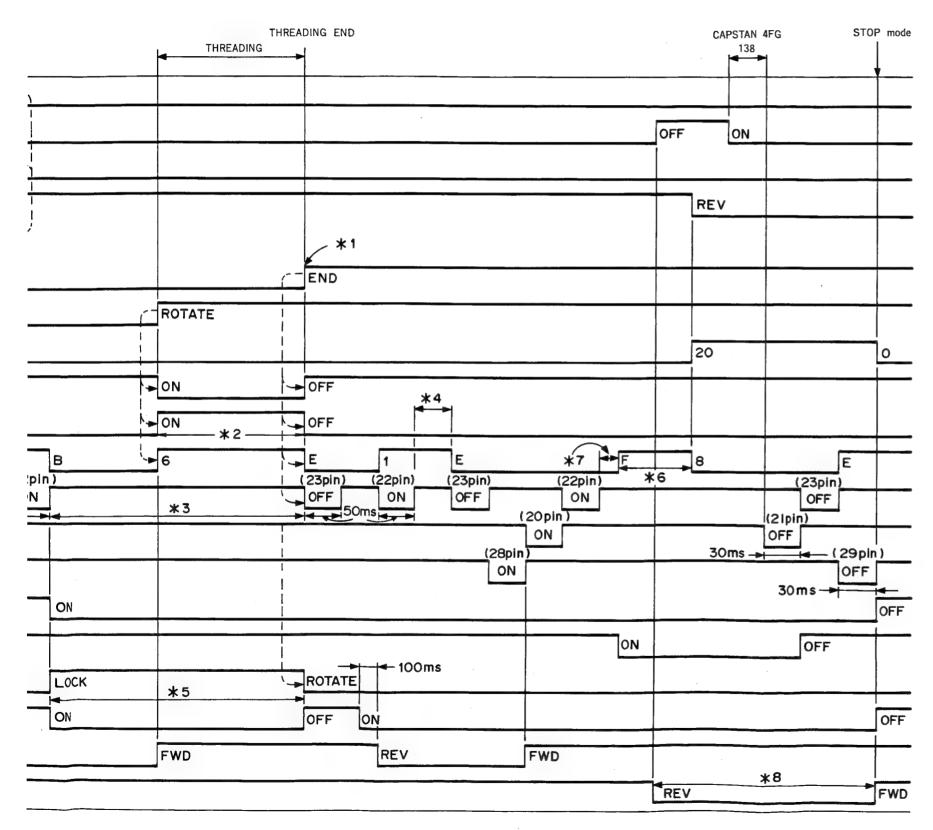


REEL COMMAND MODE TABLE

		Con	nmand			Supply	Take-Up	T
Mode	A	В	С	D	Operation	Reel	Reel	Remarks
0	0	0	0	0	FF	Sending out the constant current by SFG.		TFG+SFG =constant SPEED SERVO
1	1	0	0	o	REW	0	Sending out the constant current by TFG.	TFG+SFG =constant SPEED SERVO
2	0	1	0	0	FWD SEARCH	Back tension by SFG.	0	Constant- tape-speed SERVO by FG.
3	1	1	0	0	REV SEARCH	\cap	Back tension by TFG.	Constant- tape-speed SERVO by FG
4	0	0	1	0	FF/ SEARCH → Brake	\cap	Free	Constant voltage drive
5	1	0	1	0	REW/ SEARCH → Brake	Free	\bigcirc	Constant voltage drive
6	0 .	1	1	0	THREAD- ING	Motor lock	\bigcirc	Constant voltage drive
7	1	1	1	0	UN- THREAD- ING	Motor lock	\cap	Constant voltage drive
8	0	0	0	1	CTL in the back space edit.	\cap	\bigcirc	Constant voltage drive
9	1	0	0	1	Sending out back space edit.	\bigcirc	\bigcirc	Constant voltage drive
A	0	1	0	1	REW → STOP	\cap	\bigcirc	Constant voltage drive
В	1	1	0	1	When the cassette UP/DOWN	\cap	\bigcirc	Constant voltage drive
С	0	0	1	1			_	
D	1	0	1	1				
E	0	1	1	ı	PAUSE	\cap	\cap	Constant voltage drive
F	1	1	1	1	FWD	\cap	\cap	Constant voltage drive

1. CASSETTE IN → THREADING → STOP

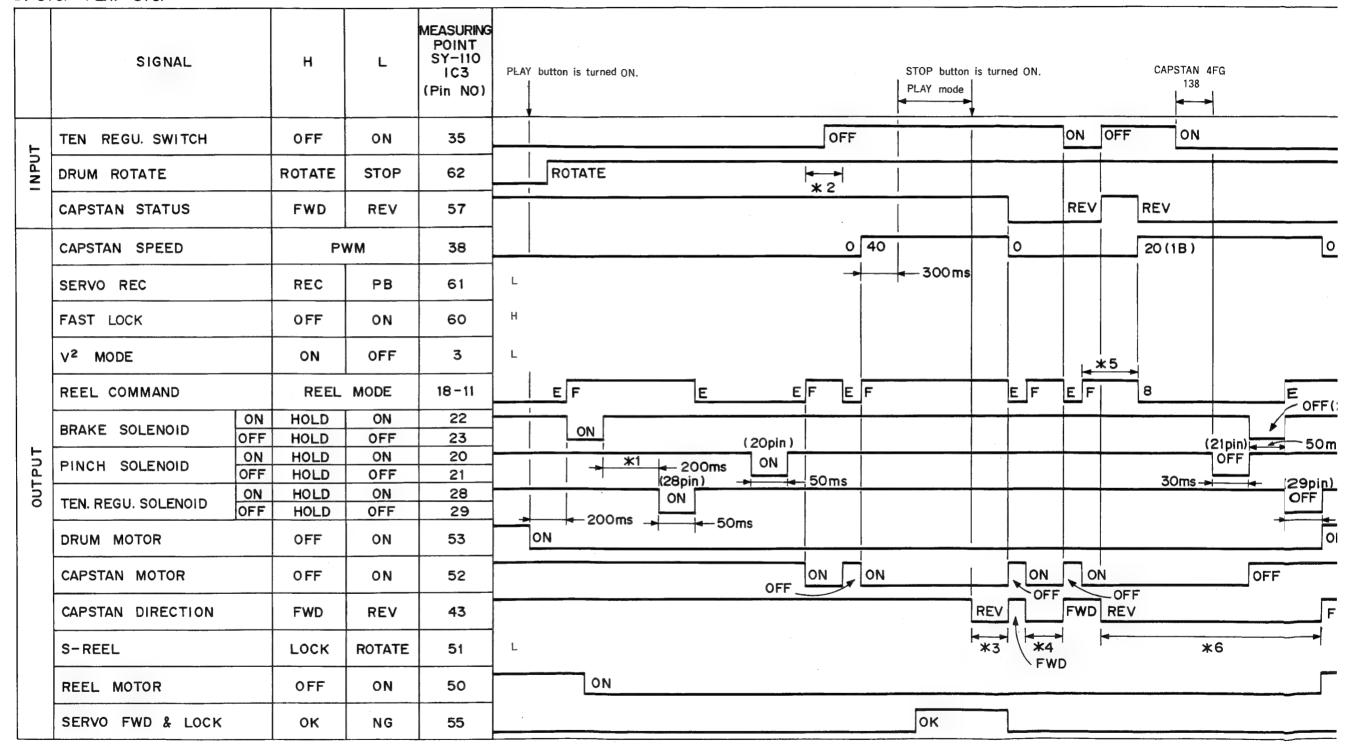
-			Н	L	POINT SY-110 IC3 (Pin NO)	CASSE	ETTE IN			THREAD		ADING END						C.	APSTAN 4FG 138
	CASSETTE IN																-		
	TEN. REGU. SWITCH		OFF	ON	35										-		OF	F	ON
	CASSETTE LOCK		FREE	LOCK	36														
INPUT	CAPSTAN STATUS		FWD	REV	57	-												REV	<u>'</u>
= [DRUM SV		LOCK	NON- LOCK	55	L	, ' '	•				*1							
	THREAD SENSE		END	MIDDLE	33		i					END							
Ī	DRUM ROTATE		ROTATE	STOP	62		<u> </u>			ROTATE						-			
	CAPSTAN SPEED		PV	WM	38		 						-				_	20	
	THREADING ON		OFF	ON	64		1		•	ON	<u> </u>	OFF		k4					
	THREADING MOTOR #1		ON	OFF	4		 		١,	ON *2		OFF							
	REEL COMMAND		REEL	MODE	11-18		1 (22)	B B	-	6	17	E (23pin)	1 (22pin)	E (23pin)	\	*7 F	*6	8	
. [BRAKE SOLENOID	ON	HOLD	ON	22		01					(23pin) OFF	ON	OFF		ON			
F		OFF	HOLD	OFF ON	23	501	ms 🖣	F		*3		50			(2	20 pin)			(2)
_	PINCH SOLENOID	OFF	HOLD	OFF	21						i					ON			OF
TU ^c		ON	HOLD	ON	28			-						(28pin)			30	ons →
OUTPU	TEN. REGU. SOLENOID	OFF	HOLD	OFF	29						i				ON				•
	DRUM MOTOR	•	OFF	ON	53			ON	. 44 4		İ								
	CAPSTAN MOTOR		OFF	ON	52											0	N		
	S-REEL		LOCK	ROTATE	51			LOCK		*5	,	ROTATE	100	ms					
	REEL MOTOR		OFF	ON	50			ON				OFF	ON		_	—			
	TAPE DIRECTION		FWD	REV	44					FWD			REV			FWD			40
[c	CAPSTAN DIRECTION		FWD	REV	43								. =				RE	.V	*8

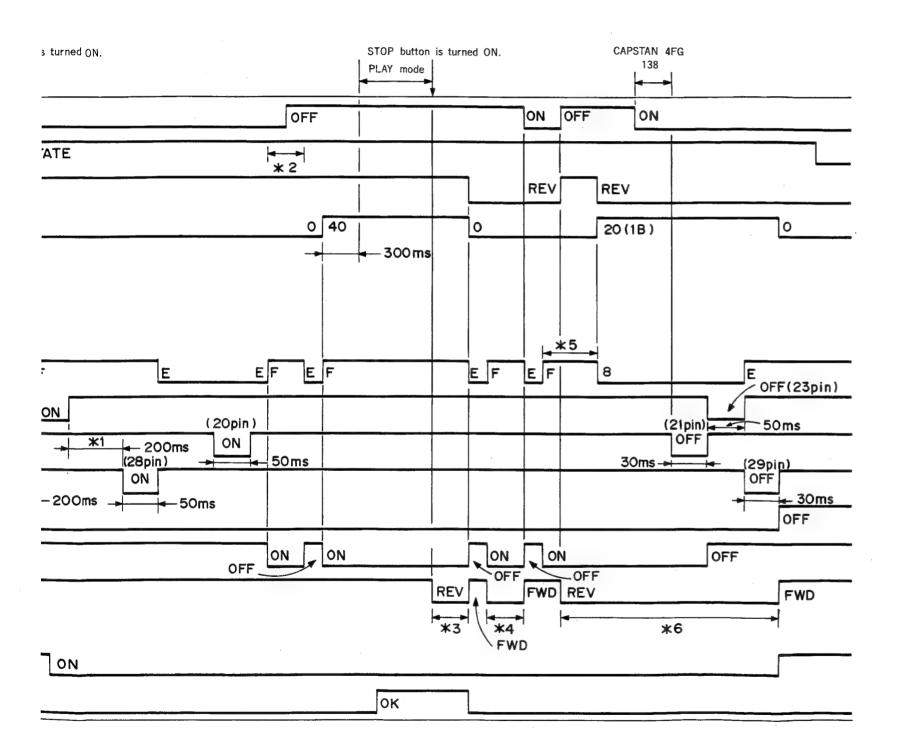


- * 1: The threading Ring rotates, and the unit is put into the THREADING END mode. The thread-end switch turns "H".
- * 2: The threading motor rotates, and then the threading ring turns in the counterclockwise direction.
- * 3: S and T main brakes are released from the reel tables.
- * 4: From cassette-in to the THREADING mode, the S-reel turns in the counterclockwise direction by 1/4 turn of threading ring's turn.
- * 5: S-reel motor rotation is locked electrically.

 Tape runs from the T-reel in the THREADING mode.
- * 6: The unit is put into the FWD mode temporarily, and then tense the tape.
- *7: The delay amount is about 100μ s.
- *8: In the STOP mode, tape tension is released by 138 capstan 4FG for tape protection.

2. STOP→PLAY→STOP

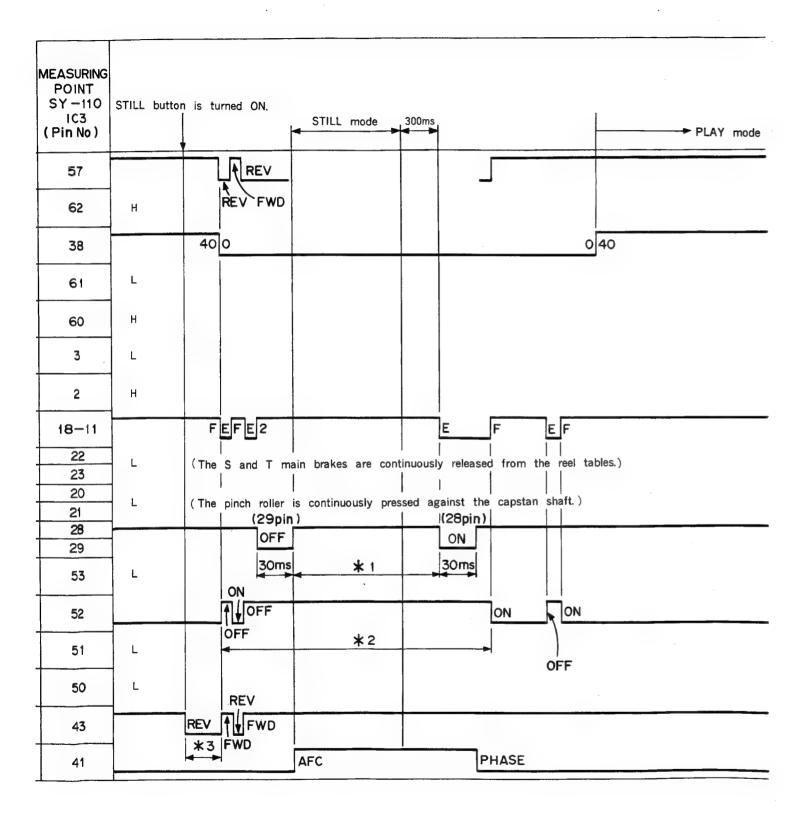




- *1: Slack in the tape is taken up.
- * 2: Forward by 5 CTL to tense the tape.
- * 3: The capstan motor is put into the reverse rotation mode for speed down of rotation.

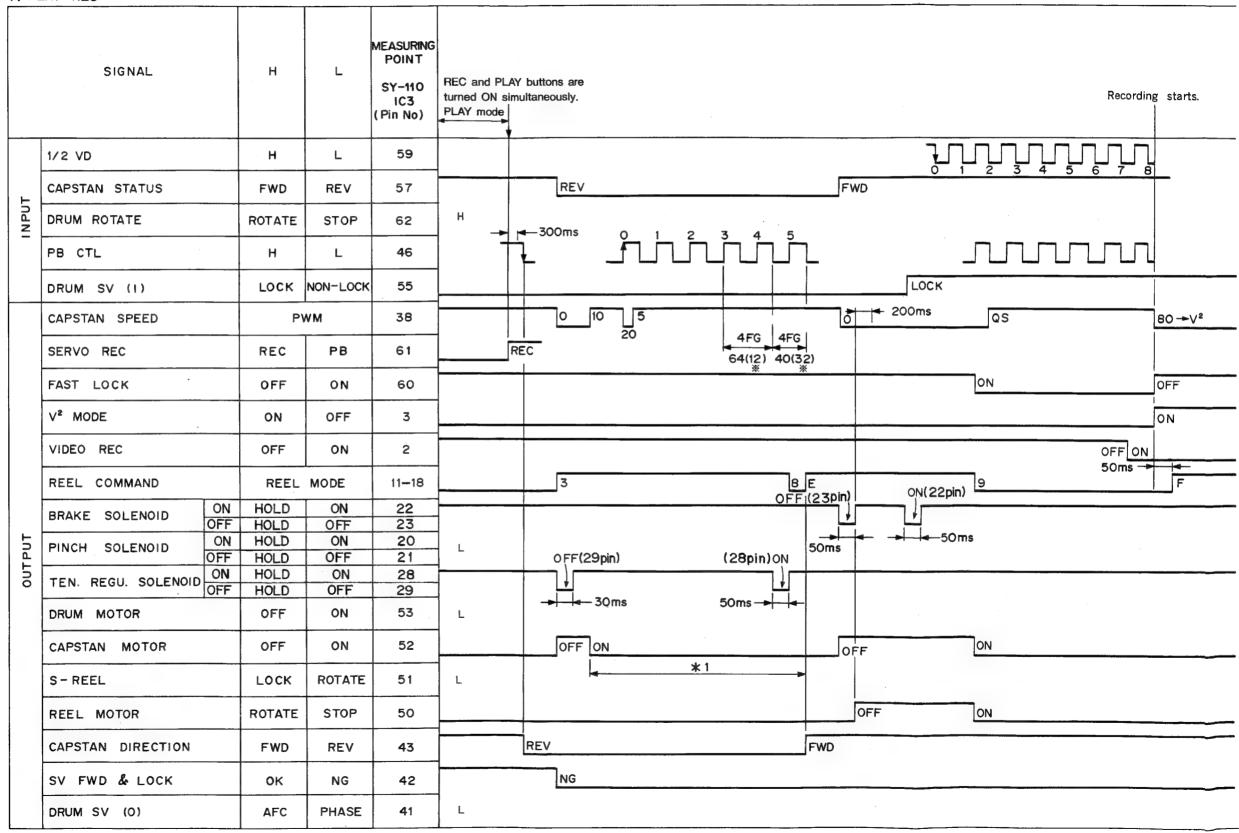
 Then, the capstan motor stops its rotation.
- * 4: This status is the same as * 3. But this atatus is skipped acutually.
- * 5: Put the unit into the FWD mode, and then tense the tape.
- * 6: In the STOP mode, the tape tension is released by 138 capstan 4FG from tension regulator switch ON point for tape protection.

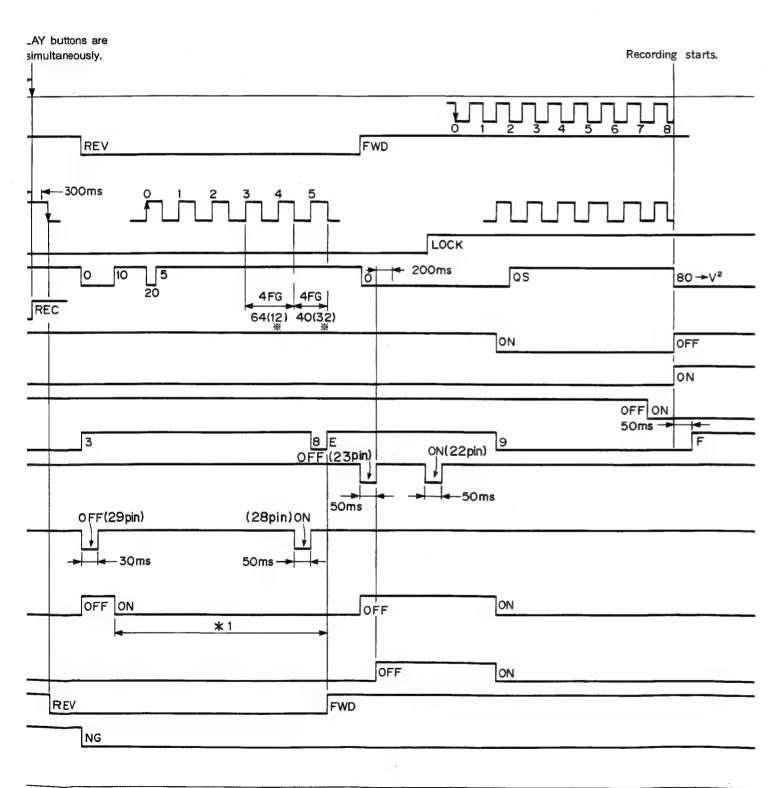
3. PI	_AY→SEARCH STILL→PL	AY				1					
	SIGNAL		н	L	MEASURING POINT SY-110 IC3 (Pin No)		on is t	turned ON.	STILL mode	300ms	s PLAY mode
5	CAPSTAN STATUS		FWD	REV	57			REV			
INPUT	DRUM ROTATE		ROTATE	STOP	62	Н		REV FWD	·		
	CAPSTAN SPEED		PI	WM .	38		40	0			0 40
	SERVO REC		REC	PB	61] [
	FAST LOCK		OFF	ON	60] н					
	V ² MODE		ON	OFF	3	L					
	VIDEO REC		OFF	ON	2	Н					
	REEL COMMAND		REEL	MODE	18-11		F	EFE2			E F EF
	BRAKE SOLENOID	ON	HOLD	ON OFF	22		(The	S and T m	I nain brakes are cor I	ı ntinuous I	sly released from the reel tables.)
OUTPUT	PINCH SOLENOID	ON OFF	HOLD	ON OFF	20	_ _ _	(The				against the capstan shaft.)
g	TEN. REGU. SOLENOID	ON	HOLD	ON	28		+	(29pi		+	(28pin) ON
	TEN. NEGG. GGEENGID	OFF	HOLD	OFF	29	1			-		
	DRUM MOTOR		OFF	ON	53	L		ON 30ms		•	30ms
	CAPSTAN MOTOR		OFF	ON	52			ON OFF			ON ON
	S-REEL		LOCK	ROTATE	51] L		OFF	*2		OFF
	REEL MOTOR		OFF	ON	50] L		REV			OI I
	CAPSTAN DIRECTION		FWD	REV	43			∱FWD		1	
	DRUM SV		AFC	PHASE	41		* 3	FWD	AFC		PHASE



- * 1: The tension solenoid is "OFF". (The pressure between video head and tape is maintained at constant.)
- * 2: Rotation of the capstan motor stops.
- * 3: Rotation speed of the capstan motor de-



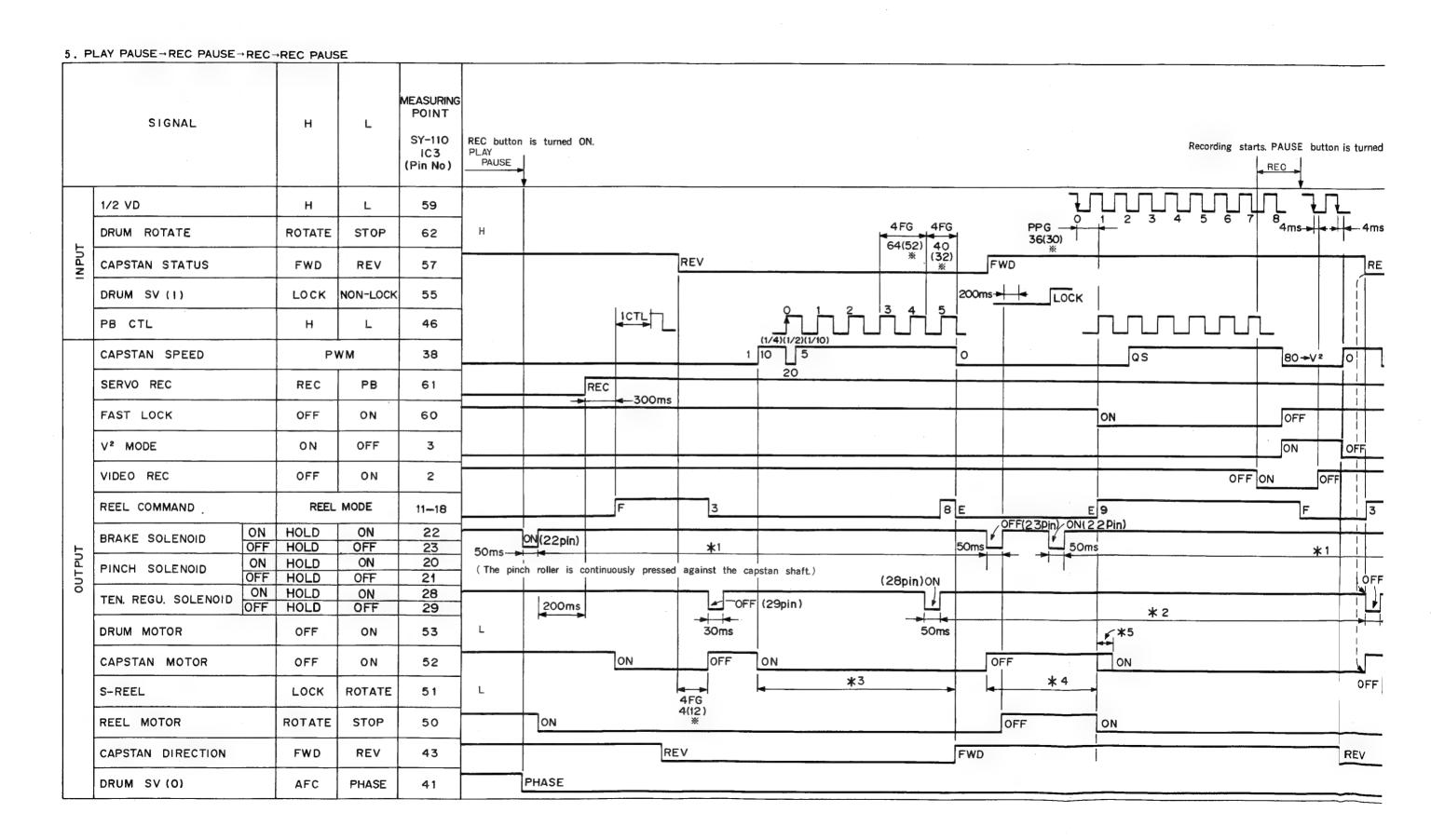


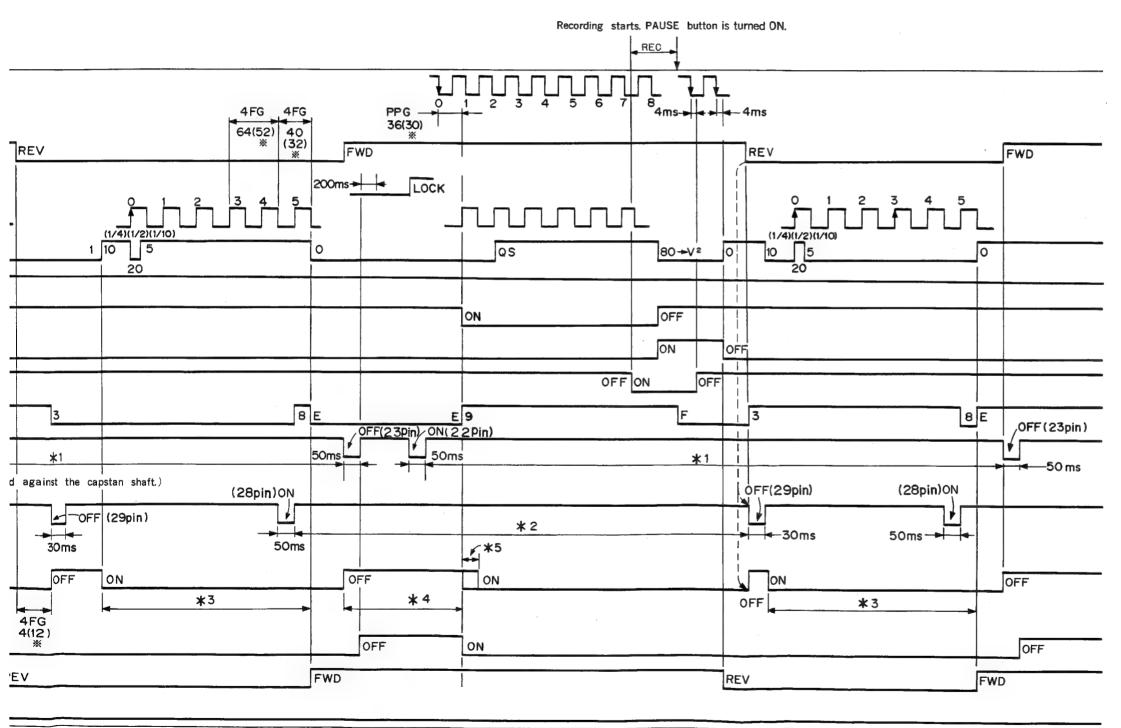


* 1: The capstan motor rotates in the REV direction and rewind the tape 5.5 CTL.

NOTE

**marked value is for PAL.





- *1: S and T main brakes are released.
- * 2: The tension regulator arm moves to the PLAY position.
- * 3: The capstan motor rotates in the REV direction and rewind the tape 5.5 CTL
- * 4: Rotation of the capstan motor stops.

NOTE

*marked value is for PAL.

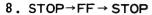
6. S	EARCH STILL→REV SEAF SIGNAL	RCH	Н	L	MEASURING POINT SY-110		
					IC3 (Pin No)	REV SE	ARCH ON REV SEARCH mode
5	CAPSTAN STATUS		FWD	REV	57		REV
TUPUI	DRUM ROTATE	-	ROTATE	STOP	62	Н	
	CAPSTAN SPEED		P۱	VM	38		00 06 50
	SERVO REC		REC	РВ	61	L	
	FAST LOCK		OFF	ON	60	Н	
	V ² MODE		ON	OFF	3	L	
	VIDEO REC		OFF	ON	2	Н	
	REEL COMMAND	_	REEL	MODE	11—18		3
	BRAKE SOLENOID	ON	HOLD	ON	22	(The	S and T main brakes are continuously released from the reel tables.)
	BIANZ GOZZIKO	OFF	HOLD	OFF	23		
15	PINCH SOLENOID	ON	HOLD	ON	20	(The	pinch roller is continuously pressed against the capstan shaft.)
OUTPUT		OFF	HOLD	OFF ON	21		
5	TEN. REGU. SOLENOID	OFF	HOLD	OFF	29	(The t	tension regulator arm is located in the PLAY position.)
	DRUM MOTOR	Jorn	OFF	ON	53	L	
	CAPSTAN MOTOR		OFF	ON	52		ON
	S-REEL		LOCK	ROTATE	51	L	
	REEL MOTOR		OFF	ON	50	L	
	CAPSTAN DIRECTION		FWD	REV	43		REV
	SV FWD & LOCK		ок	NG	42	L	
	DRUM SV		AFC	PHASE	41	н	

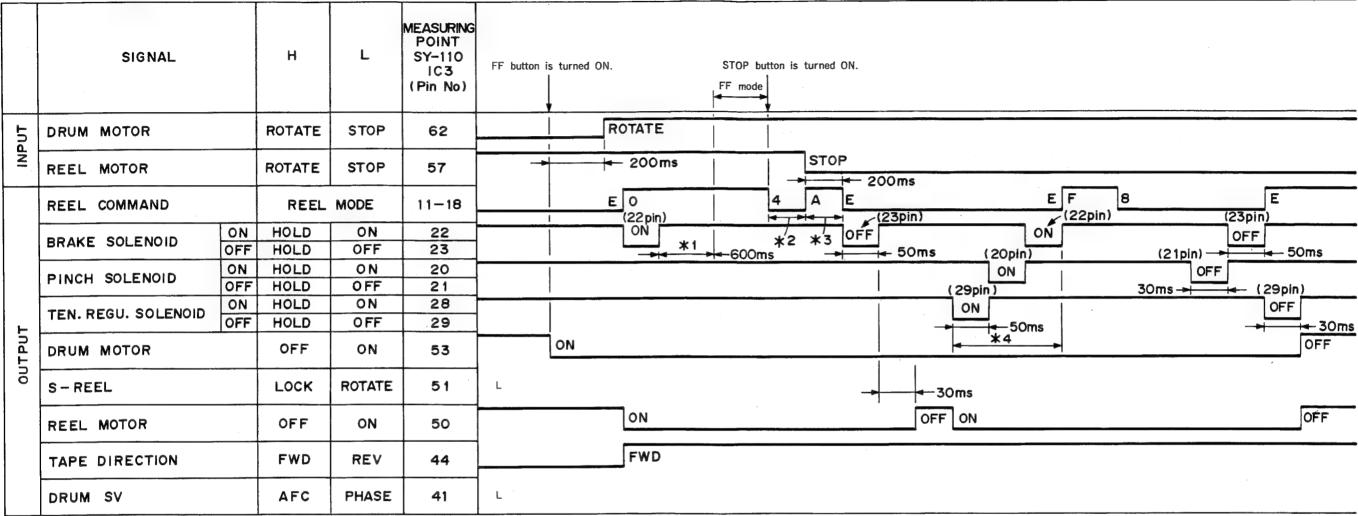
* 1:

н	L	MEASURING POINT SY-110 IC3 (Pin No)	REV SE	ARCH ON REV SEARCH mode
FWD	REV	57		REV
ROTATE	STOP	62	н	
PW	/M	38		00 06 50
REC	РВ	61	L	
OFF	ON	60	н	
ON	OFF	3	L	
OFF	ON	2	н	
REEL	MODE	11—18		3
HOLD	ON	22	/ The	S and T main brakes are continuously released from the reel tables.)
HOLD	OFF	23	(Ine	and I main brakes are continuously released from the real tables.
HOLD	ON	20	/ T he	which walles is continuously proposed excinct the constant short
HOLD	OFF	21	(ine	pinch roller is continuously pressed against the capstan shaft.)
HOLD	ON	28	(tension regulator arm is located in the PLAY position.)
HOLD	OFF	29	(Ine	ension regulator ann is located in the FEAT position.
OFF	ON	53	L	
OFF	ON	52		ON
LOCK	ROTATE	51	L	
OFF	ON	50	L	
FWD	REV	43		REV
ОК	NG	42	L	
AFC	PHASE	41	н	

* 1: When CAPSTAN STATUS signal is "L" (REV), this status in skipped.

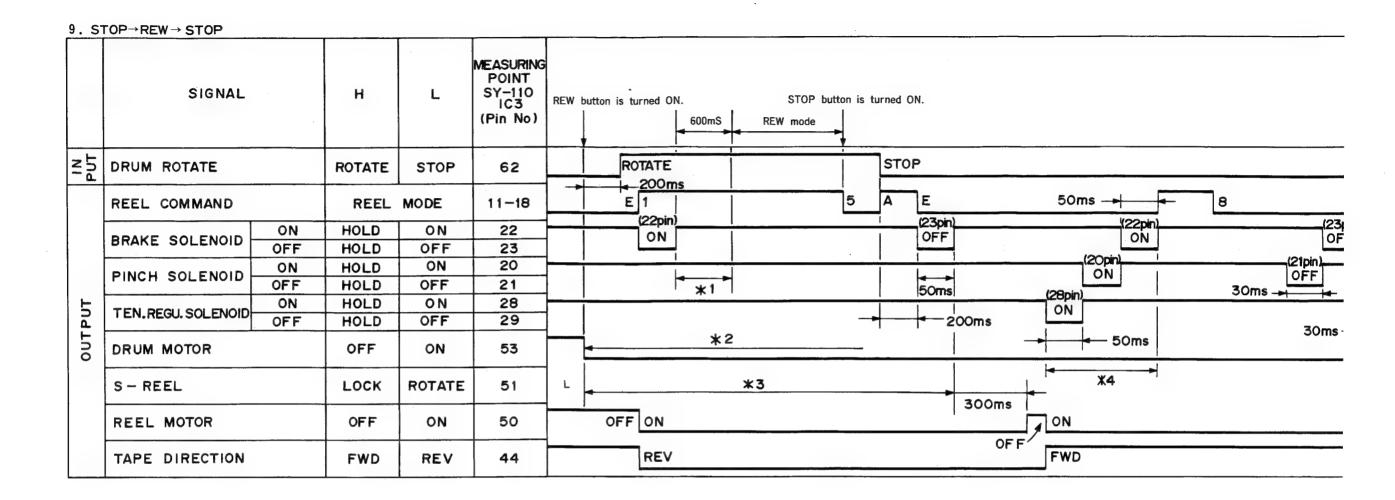
7. SI	EARCH STILL→FWD SEAF	RCH			·					
	SIGNAL		н	L	MEASURING POINT SY-110 IC3 (Pin No)		WD SEAF	RCH ON		► FWD SEARCH mode
5	DRUM ROTATE		ROTATE	STOP	62	Н				
INPUT	CAPSTAN STATUS		FWD	REV	57				FWD	
	CAPSTAN SPEED		PV	VM	38			00 06	50	
	SERVO REC		REC	PB	61	L				
	FAST LOCK		OFF	ON	60	н				
	V ² MODE		ON	OFF	3	L				
	VIDEO REC		OFF	ON	2	н				
	REEL COMMAND		REEL	MODE	11-18			2		
	BRAKE SOLENOID	ON	HOLD	ON	22	L				
		OFF	HOLD	OFF	23					
5	PINCH SOLENOID	ON OFF	HOLD	ON OFF	20	L				
OUTPUT		ON	HOLD	ON	28					
0	TEN. REGU. SOLENOID	OFF	HOLD	OFF	29	Н				
	DRUM MOTOR		OFF	ON	53	L				
	CAPSTAN MOTOR		OFF	ON	52			ON		
	S-REEL		LOCK	ROTATE	51	L				
	REEL MOTOR		OFF	ON	50	L				
	CAPSTAN DIRECTION	-	FWD	REV	43			FWD		· · · · · · · · · · · · · · · · · · ·
-	SV FWD & LOCK		ок	NG	42	L				
	DRUM SV		AFC	PHASE	41	н				

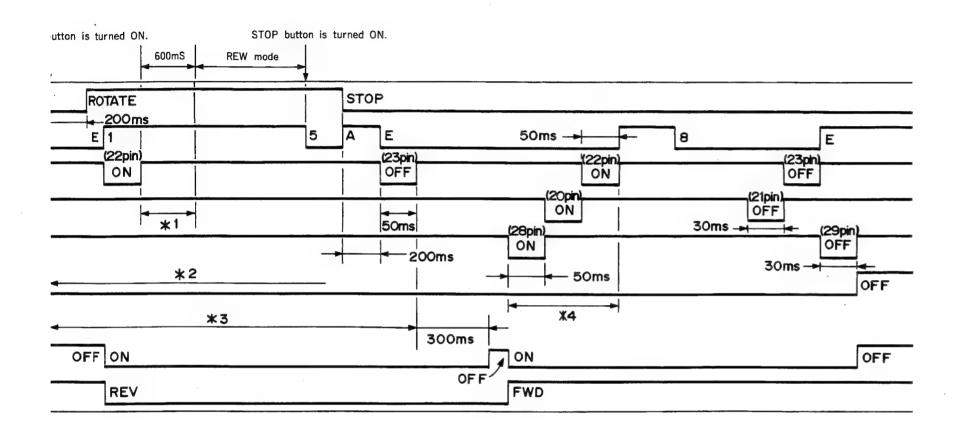




- * 1: This status prevents the mode change until the rotation of reel motor keeps certain speed.
- * 2: Reverse voltage is supplied to the motor in order to brake.
- * 3: S-reel turns to take up any slack in the tape.
- * 4: The TEN.REGU. solenoid turns ON. The pinch roller presses against the capstan shaft.

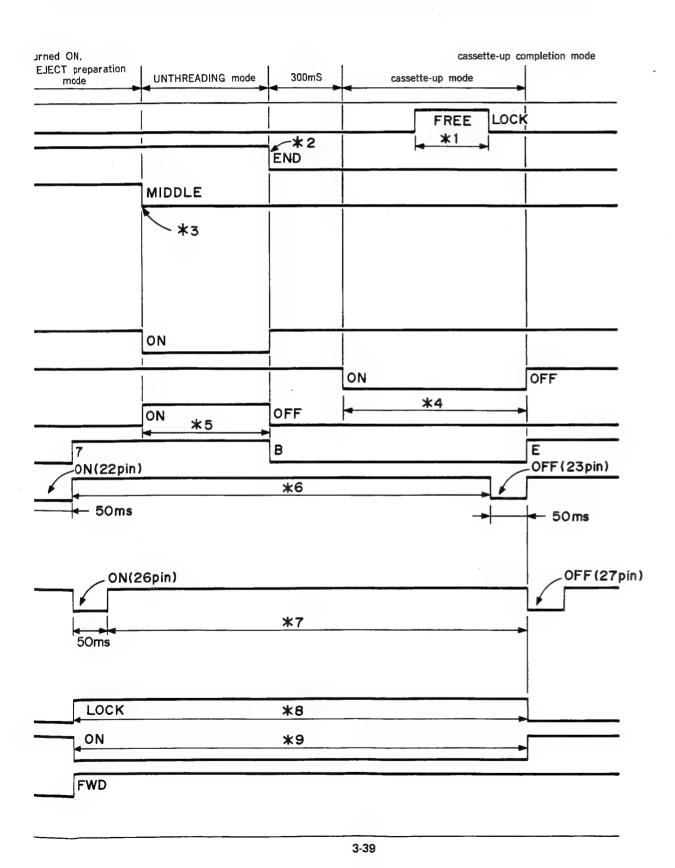
 Then, the reel brake is released.





- * 1: This status prevents the mode change until the rotation of reel motor keeps certain speed.
- * 2: Reverse voltage is supplied to the motor in order to brake.
- * 3: S-reel turns to take up any slack in the tape.
- * 4: The TEN.REGU. solenoid turns ON. The pinch roller presses against the capstan shaft. Then, the reel brake is released.

	SIGNAL		н	L	MEASURING POINT SY-110 IC3 (Pin No)	EJECT button	is turned ON. EJECT preparation mode	UNTHREADING mo	ode 300mS	cassette-up mod	1	mpletion mode
	CASSETTE LOCK		FREE	LOCK	36		<u>.</u>			FRE	LOCK	
	UNTHREAD SENSE		MIDDLE	END	34				*2 END	* 1	→	
INPUT	THREAD SENSE		END	MIDDLE	33		· <u>·</u> ·····	MIDDLE		· .		
=	DRUM ROTATE		ROTATE	STOP	62	н		*3				Í
	CAPSTAN STATUS		FWD	REV	57	L						
	CAPSTAN SPEED		PI	WM	38	L						
	THREADING ON		OFF	ON	64			ON				
	EJECT MOTOR		OFF	ON	6					ON		OFF
	THREADING MOTOR #	2	ON	OFF	5		ain i	ON *5	OFF	*4	-	
	REEL COMMAND		REEL	MODE	11-18		7 ON(22pir	1	В			E OFF(23pin)
	BRAKE SOLENOID	ON	HOLD	OFF	22 23		-		*6	· · · · · · · · · · · · · · · · · · ·	76	
⊢	PINCH SOLENOID	ON OFF	HOLD	ON OFF	20	Н	→ 50ms				+	← 50 ms
OUTPUT	TEN. REGU. SOLENOID	ON OFF	HOLD HOLD	ON OFF	28 29	Н	201/	OC-inl				_OFF(2
0	EJECT SOLENOID	ON OFF	HOLD	ON OFF	26 27		- ONE	26pin)				OFF (2
	DRUM MOTOR	1	OFF	ON	53	н	50ms		*7			_
	CAPSTAN MOTOR		OFF	ON	52	н						
	S-REEL		LOCK	ROTATE	51		LOCK		*8			
	REEL MOTOR		OFF	ON	50		ON		*9			
	TAPE DIRECTION		FWD	REV	44		FWD	· · · · · · · · · · · · · · · · · · ·				
	CAPSTAN DIRECTION		FWD	REV	43	н				-		



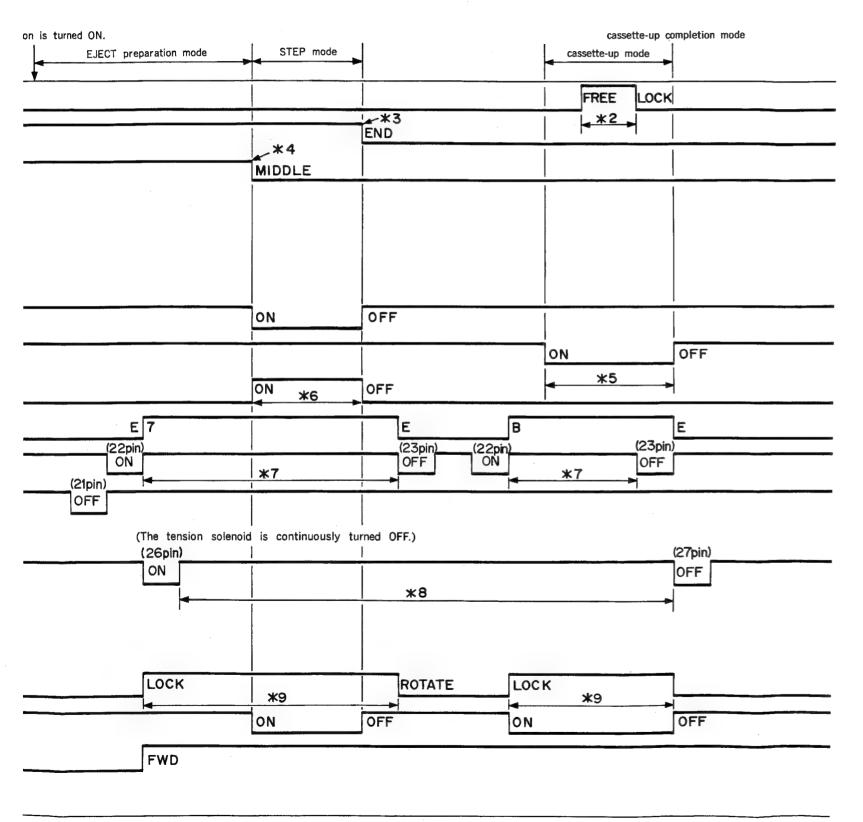
- * 1: When the eject motor rotates, the lock of the cassette-up compartment is released, and then the cassette-lock switch enters FREE once.

 When cassette-up compartment moves up, the cassette-lock switch locks again.
- * 2: The threading ring rotates. The UNTHREAD-ING END mode is released and then UNTH-READ SENSE signal becomes "L".
- * 3: The threading ring rotates. The THREADING END mode is released, and then the THREAD-SENSE signal becomes "L".
- * 4: The EJECT motor rotates, and then releases the lock of the cassette-up compartment.
- * 5: The threading ring rotates in the clockwise
- *6: S and T main brakes are released from the reel tables.
- * 7: The EJECT solenoid turns ON. Roller of the theading ring is released.
- * 8: S-reel motor is locked. Therefore, the tape is rewound in T-reel.
- * 9: The reel motor rotates.

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11. STOP → UNTHREADING/STEP MODE → EJECT

	SIGNAL		н	L	MEASURING POINT SY-110 IC3 (Pin NO)		is turned ON. EJECT	preparation mode	STEP mode		cassette-up mo	e-up completion mod
	CASSETTE LOCK		FREE	LOCK	36						FREE	LOCK
	UNTHREAD SENSE	-	MIDDLE	END	34				<u> </u>	END	*2	
NPUT	THREAD SENSE		END	MIDDLE	33				#4 MIDDLE			
_	DRUM ROTATE		ROTATE	STOP	62	н						
	CAPSTAN STATUS		FWD	REV	57	L						
	CAPSTAN SPEED		P\	WM	38	L						
	THREADING ON		OFF	ON	64	:	-		ON	OFF	Ì	
,	EJECT MOTOR		ON	OFF	6						ON	OFF
	THREADING MOTOR #	‡ 2	ON	OFF	5				ON *6	OFF	*5	
	REEL COMMAND		REEL	MODE	11-18		(22	E 7		E (23pin) (2	B	E 23pin)
	BRAKE SOLENOID	ON	HOLD	ON	22		0	N T	14.7	OFF	ON	OFF
	DIVARLE GGEE, VOID	OFF		OFF	23 -		(21pin)	—	<u> </u> *7		*7	
	PINCH SOLENOID	ON	HOLD	ON	20		OFF					
5		OFF	HOLD	OFF	21							
OUTPU	TEN. REGU. SOLENOID	OFF	HOLD	ON	28	н			noid is continuously t			
Š				OFF	29							(27pin)
	EJECT SOLENOID	ON	HOLD	ON	26			ON				OFF
	DRUM MOTOR	OFF	HOLD OFF	OFF	53	н		-		<u> </u>		—
	CAPSTAN MOTOR		OFF	ON	52	Н.						
	S-REEL		LOCK	ROTATE	51			LOCK	*9	ROTATE	LOCK *9	
	REEL MOTOR		OFF	ON	50				ON	OFF	ON	OFF
	TAPE DIRECTION	,	FWD	REV	44		·	FWD				
	CAPSTAN DIRECTION		FWD	REV	43	н						



- * 1: When the slack is detected, the threading ring moves once in the STEP mode. (The threading ring does dot move to the EJECT completion position.) When pushing the EJECT button four or five times, the threading ring moves to the EJECT completion position.
- * 2: When the EJECT motor rotates, lock of the cassette-up compartment is released.

 The cassette-lock switch turns FREE once.

 When the cassette-up compartment moves up, the cassette-lock switch is loked again
- * 3: The threading ring rotates and enters UN-THREADING END mode. The signal becomes "L".
- * 4: The threading ring rotates, and releases the THREADING END mode. The THREAD SENSE signal becomes "L".
- * 5: EJECT motor rotates, and then releases the lock of the cassette-up compartment.
- * 6: The threading ring rotates in the clockwise direction.
- * 7: S and T main brakes are released from the reel tables.
- * 8: The EJECT solenoid turns ON, and then roller of the threading ring is released.
- * 9: The S-reel motor is locked, Therefore, the tape is rewound in the T-reel.

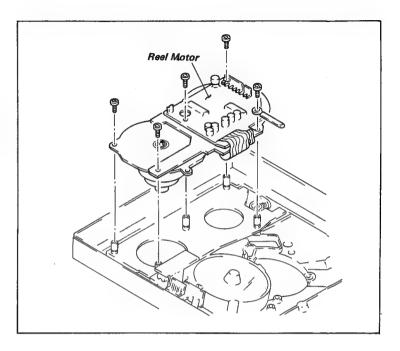
3-42

SECTION 4 REPLACEMENT OF MAJOR PARTS

4-1. REPLACEMENT OF THE REEL MOTOR

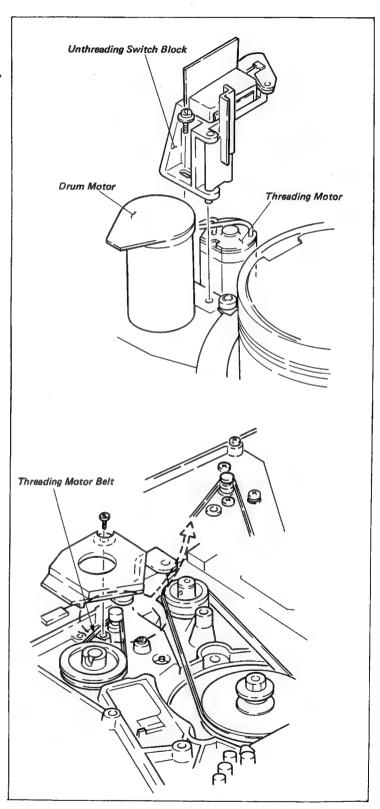
Mode: Unthreading end Replacement procedure:

- (1) Remove the Left Side Panel and the Bottom Plate.
- (2) Remove the CN Retainer and Battery Case.
- (3) Remove the SD-16P Board, and then remove the reinforcement stay.
- (4) Disconnect the CNP51 and CNP52 of the Reel Motor.
- (5) Remove the five screws as shown in the figure and replace the Reel Motor.
- (6) Perform the adjustments as described in Section 4-17.



4-2. REPLACEMENT OF THE THREADING MOTOR

- (1) Disconnect the connector from the SW-24 Board.
- (2) Remove the KY-110P Board and the Meter Panel Block,
- (3) Disconnect the CN4 on the SY-110 Board from the Threading Motor.
- (4) Remove the Unthreading Switch Block.
- (5) Remove the Battery Case.
- (6) Remove the Threading Motor Belt of the motor side.
- (7) Remove the defective Threading Motor.
- (8) Thread the connector of the new motor through the hole of the chassis, and then install the new motor.
- (9) Thread the harness of the motor through the harness holder, and then connect it to CN4 on the SY-110 Board.
- (10) Re-assemble by reversing steps.
- (11) Perform the adjustments as described in Section 4-17.



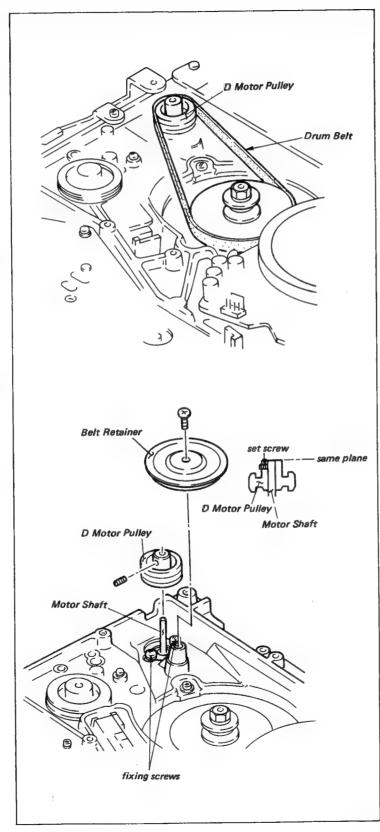
4-3. REPLACEMENT OF THE DRUM MOTOR

Tool: Allen wrench (across flat has 0.89 mm)

Replacement procedure:

- (1) Open the SD-16P Board, and then disconnect the CN2 on the SD-16P Board from the Drum Motor.
- (2) Remove the Battery Case.
- (3) Remove the Belt Retainer.
- (4) Remove the Drum Belt.
- (5) Remove the D Motor Pulley with an allen wrench.
- (6) Remove the defective Drum Motor.

 Thread the connector of the new motor through the hole of the chassis, and then install the Drum Motor.
- (7) Install the D Motor Pulley into the motor shaft so that the positional relationship of the D Motor Pulley and motor shaft meets the required specification.
- (8) Clean the Drum Belt and install the Belt. NOTE: The white mark of the Drum Belt should be outside.
- (9) Install the Belt Retainer.
- (10) Thread the connector of the new motor through the harness holder, and connect to CN2 on the SD-16P Board.
- (11) Install the SD-16P Board.
- (12) Install the Battery Case.
- (13) Perform the adjustments as described in Section 4-17.

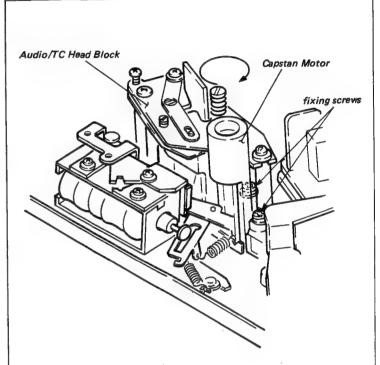


4-4. REPLACEMENT OF THE CAPSTAN MOTOR

 The Capstan Motor Shield Plate is pasted on the Capstan Motor. Therefore, when replacing the Capstan Motor, replace the following part simultaneously.

A-6759-147-A: SHIELD ASS'Y, CAPSTAN

- (1) Remove the Battery Case.
- (2) Disconnect the connectors, CNP1 and CNP2 from the Capstan Motor.
- (3) Remove the fixing screw of the VRA-1 Board, and then open it.
- (4) Remove the Audio/TC Head Block.
- (5) Remove the two fixing screws as shown in the figure, and then remove the Capstan Motor.
- (6) Paste the Capstan Shield Plate Ass'y on the Capstan Motor.
- (7) Install the Capstan Motor. While turning the Capstan Motor in the clockwise direction as viewed from top of the unit, and tighten the fixing screws. Be careful not to scratch the capstan shaft.
- (8) Re-assemble by reversing steps.
- (9) Perform the adjustments as described in Section 4-17.



4-5. REPLACEMENT OF THE UPPER DRUM

 The Rotary Video Heads cannot be replaced individually. Therefore, replace the entire Upper Drum Assembly when replacing the Rotary Video Heads.

Tool: Drum eccentricity gauge (1)

Drum eccentricity gauge (2)

Drum eccentricity gauge (3)

Drum eccentricity gauge (5)

Cleaning fluid

Cleaning piece

Replacement procedure:

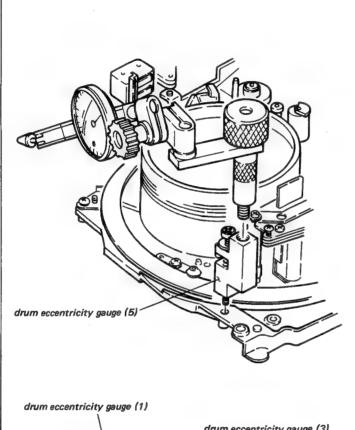
- (1) Remove the Drum Cover.
- (2) Remove the two fixing screws, and then remove the Brush Base.
- (3) Disconnect the seven connectors from the round printed circuit board at the center of the drum.
- (4) Remove the two fixing screws, and then remove the Upper Drum.
- (5) Clean the matching surfaces of the flange and new Upper Drum Assembly with a cloth moistened with cleaning fluid.

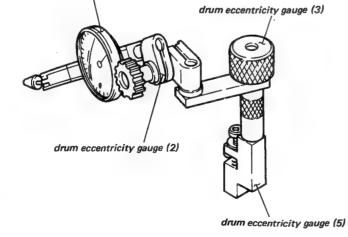
(If there is a spacer between drum and flange, it should be remained in place, or be re-installed in the same place with the new Upper Drum Assembly. The spacer is 0.01 mm, 0.03 mm, 0.05 mm or 0.1 mm thick.)

(6) Place the Upper Drum Assembly so that the silk screened "BCH" on the PA Board is close to the marked "RCB" side of the round printed circuit board as shown in the figure. Thread the two fixing screws snugly but do not tighten.

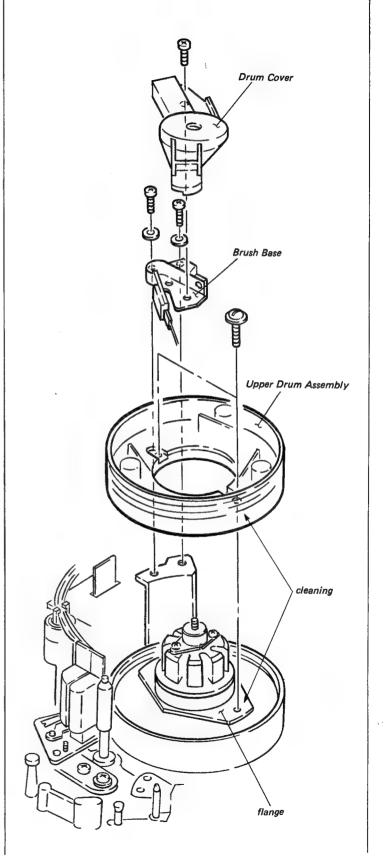
Adjustment procedure:

- (1) Remove the VRA-1 Board, and then disconnect the four connectors.
- (2) Assemble the drum eccentricity gauge (1), (2), (3) and (5) as shown in the figure. Mount the assembled gauges on the unit so that the tip probe is positioned at a point about 5 mm from the top edge of the Upper Drum.

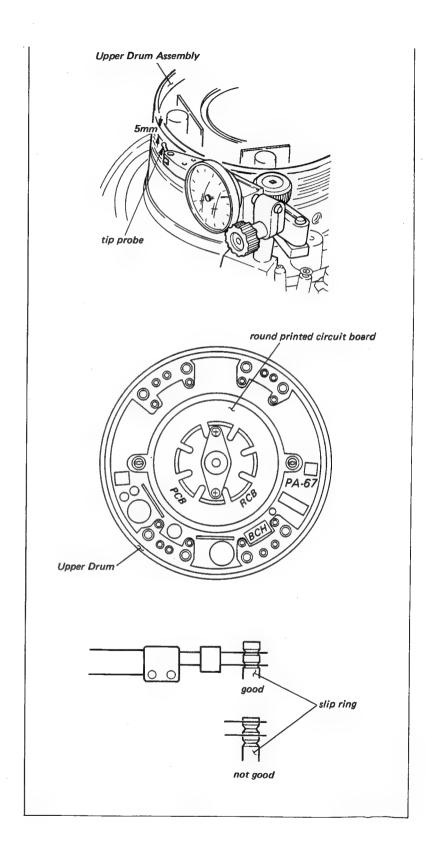




- (3) Turn the Upper Drum slowly in the clockwise direction, and then confirm the pointer deflection of the gauge is within 5 microns during one complete turn of the Upper Drum. If this specification is satisfied, proceed to Step (5). If the gauge deflection is out of specification, perform the remaining steps.
- (4) Tap the upper side of the Upper Drum with a nylon hammer or a screwdriver handle so that the gauge deflection remains within 5 microns.
- (5) After the adjustment, tighten the two fixing screws alternately and gradually with a tightening torque (8 Kg.cm).
- (6) After the screws are tightened, check again that the eccentricity of the Upper Drum is within 5 microns.
- (7) Connect the seven connectors to the Upper Drum.
- (8) Install the Brush Base so that the brush height correspond to the height of the srip-ring groove.
- (9) Install the Drum Cover.
 - NOTE: Put the pin on the back of the
 Drum Cover into the hole of the
 Brush Base. If it is not satisfied,
 the Drum does not turn as the
 Upper Drum touches the Drum
 Cover.
- (10) Perform the adjustments as described in Section 4-17.

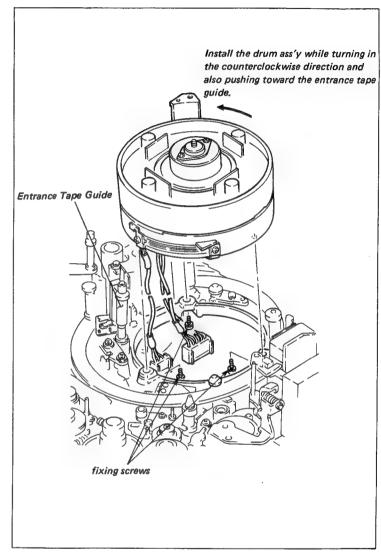


4-5



4-6. REPLACEMENT OF THE DRUM ASSEMBLY

- (1) Remove the fixing screw of the VRA-1 Board, and then open it.
- (2) Remove the CN3 (white) and CN4 (black) on the back of the VRA-1 Board.
- (3) Disconnect the connector from the srip-ring.
- (4) Remove the Battery Case.
- (5) Disconnect the CN10 (red) and CN11 (yellow) from the MB-157 Board.
- (6) Remove the Drum Belt.
- (7) Disconnect the connector from the drum assembly.
- (8) Remove the three fixing screws of the drum assembly from under side of the unit, and then remove the defective drum.
- (9) Thread the harness of CN3 (white) and CN4 (black) through the hole of the chassis.
- (10) Connect the CN10 and CN11 to the MB-157 Board.
 - NOTE: Secure the drum harness with harness retainers so that the drum harness does not touch the Drum Pulley.
- (11) While turning the drum ass'y in the counterclockwizse direction and pushing the drum toward the Entrance Tape Guide, as viewed from top of the unit, install the new drum.
- (12) Install the Drum Belt.
 NOTE: The white mark of the Drum Belt should be outside.
- (13) Install the Battery Case.
- (14) Connect the connectors to the VRA-1 Board, and then install the VRA-1 Board to the unit.



4-7. REPLACEMENT OF THE AUDIO HEAD

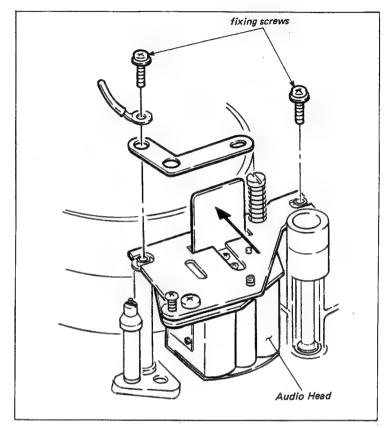
Replacement procedure:

- (1) Remove the fixing screw of the VRA-1 Board, and then open the VRA-1 Board.
- (2) Remove the defective Audio Head Block.
- (3) Disconnect the four connectors from the Audio Head.

connectors: Board-in connectors (3 pieces)

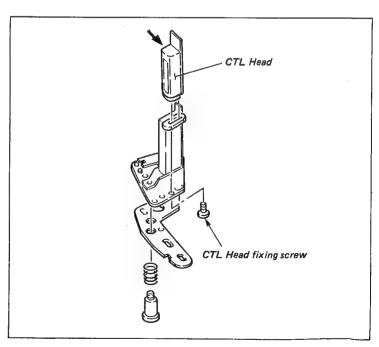
TC harness (1 piece)

- (4) Connect the four connectors to the new Audio Head.
- (5) While pushing the Audio Head in the direction of the arrow, install it.
- (6) Install the Audio Head Block to the unit.
- (7) Install the VRA-1 Board.
- (8) Perform the adjustments as described in Section 4-17.



4-8. REPLACEMENT OF THE CTL HEAD

- (1) Remove the harness from the CTL Head, and connect it to the new CTL Head.
- (2) Remove the CTL Head Block.
- (3) Remove the fixing screws of the CTL Head.
- (4) Install the new CTL Head to the CTL Head Block while pushing the head in the direction of the arrow.
- (5) Install the CTL Head Block, and then perform the adjustments as described in Section 4-17.



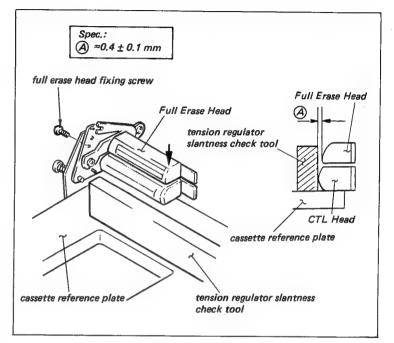
4-9. REPLACEMENT OF THE FULL ERASE HEAD

Tool: Cassette reference plate

Tension regulator slantness check tool

Thickness gauge

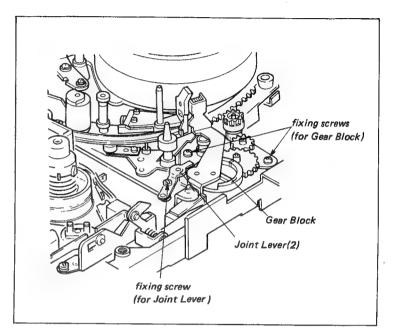
- (1) Unsolder the leads from each board of the CTL Head and Full Erase Head.
- (2) Remove the CTL/Full Erase Head Block.
- (3) Remove the Full Erase Head.
- (4) While pushing the Full Erase Head in the direction of the arrow, install the new one.
- (5) Place the CTL/Full Erase Head Block on the cassette reference plate as shown in the figure. (Place the right side of the CTL Head on the cassette reference plate, and then put the Mounting Plate out of the cassette reference plate.)
- (6) When placing the tension regulator slantness check tool against the CTL Head as shown in the figure, adjust the position of the Full Erase Head so that the clearance between the tool and the Full Erase Head meets the required specification. (Be careful not to scratch the Heads.)
- (7) Arrange the leads.
- (8) Install the CTL/Full Erase Head Block, and perform the adjustments as described in Section 4-17.



4-10. REPLACEMENT OF THE GEAR BLOCK

Replacement procedure:

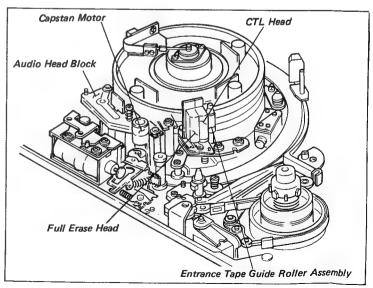
- (1) Remove the fixing screw of the Joint Lever (2).
- (2) Remove the Battery Case.
- (3) Remove the Threading Motor Belt, Pulley Cover and Pulley.
- (4) Remove the two fixing screws of the Gear Block, and then remove the Gear Block.
- (5) Install the new Gear Block.
- (6) Install the Pulley.
- (7) Clean the Threading Motor Belt with a cloth moistened with cleaning fluid, and then install the Threading Motor Belt.
- (8) Install the Pulley Cover.
- (9) Install the Battery Case.
- (10) Tighten the fixing screw of the Joint Lever (2).
- (11) Perform the adjustments as described in Section 4-17.



4-11. REPLACEMENT OF THE ENTRANCE TAPE GUIDE ROLLER ASSEMBLY

- The component parts of the Entrance Tape Guide Roller Ass'y cannot be replaced individually since the Entrance Tape Guide Roller Ass'y is prepared as a whole assembly.
- The fixing screw of the Entrance Tape Guide Roller Ass'y can not be removed without removing the Capstan Motor. Therefore, perform the following procedures.

- (1) Remove the Audio Head Block.(Refer to Sec. 4-7.)
- (2) Remove the Battery Case.
- (3) Remove the Capstan Motor. (Refer to Sec. 4-7.)
- (4) Remove the fixing screw on the back of the chassis, and then replace the Entrance Tape Guide Roller Ass'y.
- (5) Install the Capstan Motor and the Audio Head Block. (Refer to Sections 4-4 and 4-7.)
- (6) Perform the adjustments as described in Section 4-17.

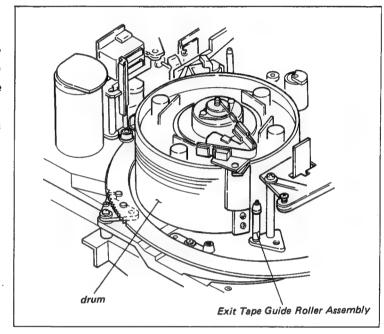


4-12. REPLACEMENT OF THE EXIT TAPE GUIDE ROLLER ASSEMBLY

. The component parts of the Exit Tape Guide Roller Ass'y cannot be replaced individually since the Exit Tape Guide Roller Ass'y is prepared as a whole assembly.

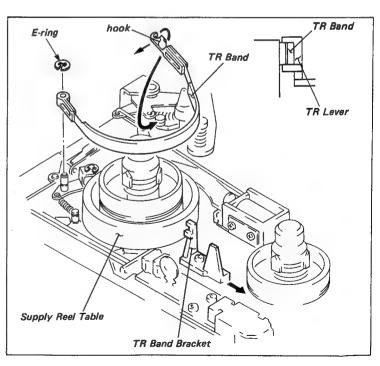
Replacement procedure:

- (1) Remove the Battery Case.
- (2) Remove the fixing screw of the Exit Tape Guide Roller Ass'y on the back of the chassis, and then replace the Exit Tape Guide Roller Ass'y.
- (3) Perform the adjustments as described in Section 4-17.



4-13. REPLACEMENT OF THE TENSION REGULATOR BAND

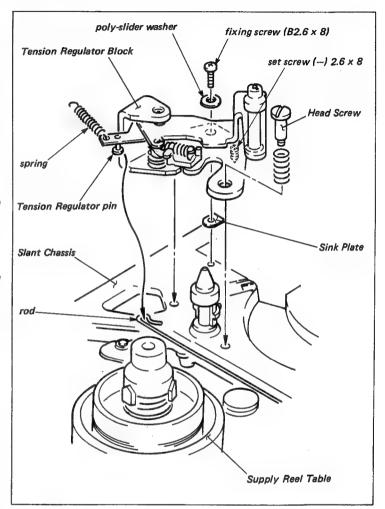
- (1) Loosen the fixing screw of the TR Band Bracket, and then push it in the direction of the arrow.
- (2) Remove the E ring of the TR Band.
- (3) Pull out the hook of the TR Band in the direction of the arrow, and then remove it.
- (4) Clean the Reel Table touching the TR Band.
- (5) Replace the new TR Band. Insert the TR Band between the two claws of the TR Lever as shown in the figure.
- (6) After the replacement, perform the adjustments as described in Section 4-17.



4-14. REPLACEMENT OF THE TENSION REGULATOR BLOCK

Replacement procedure:

- (1) Unhook the spring from the Left Side Panel.
- (2) Remove the head screw. (Be sure not to lose the spring.)
- (3) Remove the fixing screw of the Tension Regulator Block.
- (4) Remove the pin of the Tension Regulator Block from the rod, and then remove the Tension Regulator Block. Confirm that the sink plate is inserted to the boss of the slant as shown in the figure.
- (5) Hook the new Tension Regulator Pin to the rod.
- (6) Insert the projection on the bottom of the Tension Regulator into the hole of the chassis, and then screw the fixing screw (B2.6 x 8) about 3 to 4 turns.
- (7) Thread the compression spring through the Head Screw. Install the Tension Regulator Block to the chassis.
- (8) Remove the set screw, (-)2.6 x 6 from the old Tension Regulator Block, and then screw it about 4 to 5 turns into the new block.
- (9) After the replacement, perform the adjustments as described in Section 4-17.



4-15. REPLACEMENT OF THE PINCH ROLLER ASSEMBLY (INCLUDING THE VERTICAL PLAY ADJUSTMENT)

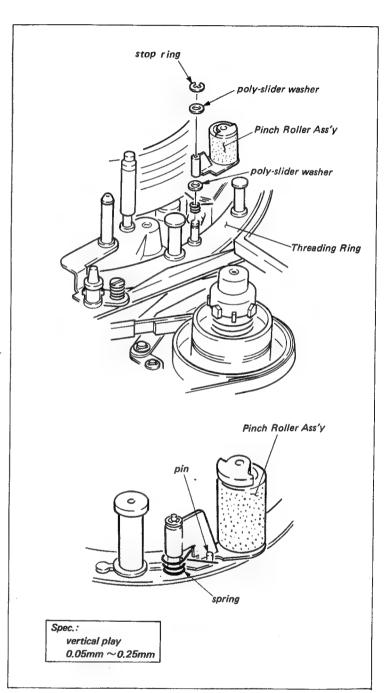
Tool: Thickness gauge

Replacement procedure:

- (1) Remove the stop ring and the poly-slider washer from the upper portion of the Pinch Roller Ass'y.
- (2) Remove the Pinch Roller Ass'y from the Threading Ring.
- (3) Never remove the poly-slider washer beneath the Pinch Roller Ass'y as shown in the figure.
- (4) Install the new Pinch Roller Ass'y.
 - NOTE: Install the spring so that the short terminal of the spring is positioned to the drum side and the long terminal is positioned to the side of the white plastic pin as shown in the figure.
- (5) Insert the poly-slider washer at the upper portion of the Pinch Roller Ass'y and secure it with a stop ring.
- (6) Push up and down the Pinch Roller Ass'y for inspection. Adjust the poly-slider washer on top of the Pinch Roller Ass'y so that the vertical play meets the required specification.

Adjustment poly-slider washer; 3-701-436-01 1.6 mm dia. 0.13 mm thick 3-701-436-11 1.6 mm dia. 0.25 mm thick 3-701-436-21 1.6 mm dia. 0.5 mm thick

- (7) Put the unit into the threading completion mode. Perform the Section 5-6-7, Pinch press lever height adjustment. After the replacement, confirm as described in Step (5).
- (8) Perform the adjustments as described in Section 4-17.

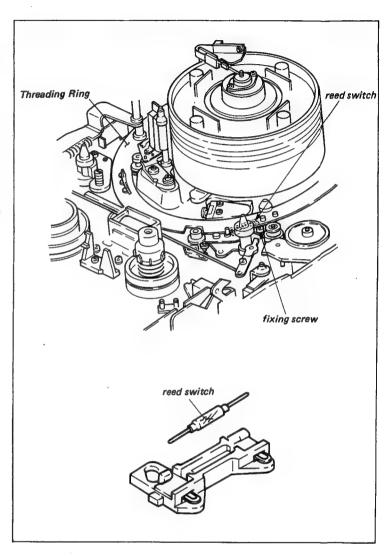


4-16. REPLACEMENT OF THE REED SWITCH

Mode: Threading end

Replacement procedure:

- (1) Remove the fixing screw, and then remove the Reed Switch Block as shown in the figure.
- (2) Unsolder the Reed Switch, and then replace with new one.
 - NOTE: Do not apply soldering iron for more than 3 seconds on any one terminal.
- (3) Install the Reed Switch Block on the VTR, and then perform the position adjustment. (Refer to Section 5-2-2.)



4-17. ITEMS TO BE ADJUSTED

(Numbers in parenthesis refer to Section numbers.)

Replacement of the Reel Motor

Reel Table Height Adjustment (5-1) —— Brake Torque Adjustment (6-1) —— FWD Back Tension Adjustment (6-2) —— Video Tracking Adjustment (7-5) (When the tracking adjustment is performed, adjust referring "Adjustment steps of Tracking Adjustment" described in Sec. 7, Alignment Information.)

Replacement of the Threading Motor

Tape Run Adjustment (T Drawer Guide Slantness Adjustment) (7-1-1)

Servo System Adjustment

Replacement of the Upper Drum

Upper Drum Eccentricity Adjustment (4-5) Video Tracking Adjustment (7-5) (When the tracking adjustment is performed, adjust referring "Adjustment Steps of Tracking Adjustment" described in Sec. 7, Alignment Information.) Video Head Dihedral Adjustment (7-14) CTL Head Position Adjustment (7-7) TC Head Position Adjustment (7-13) Switching Position Adjustment (7-16) Video System Adjustment

Replacement of the Drum Assembly

Servo System Adjustment Adjust referring "Adjustment Steps of Tracking Adjustment" described in Sec. 7, Alignment Information Video.

System Adjustment

Replacement of the Drum Motor

Servo System Adjustment

Replacement of the Capstan Motor

Thread End Position Adjustment (5-5-3)
Stopper Arm B Position Adjustment (5-5-4)
Thread End Switch Position Adjustment (5-5-5)
Pinch Press Mechanism Block Position Adjustment (5-6-6)
Tape Run Adjustment Around Pinch Roller (7-1-2)
Video Tracking Adjustment (7-5) (When the tracking adjustment is performed, adjust referring "Adjustment Steps of Tracking Adjustment" described in Sec. 7, Alignment Information.)
Servo System Adjustment

Replacement of the Audio/TC Head

Audio/TC Head Zenith Adjustment (7-4) Audio Head Height Adjustment (7-10) Audio Head Phase Adjustment (7-12) Audio/TC Head Zenith Adjustment (7-4) Video Tracking Adjustment (7-5) (When the tracking adjustment is performed, adjust referring "Adjustment steps of Tracking Adjustment" described in Sec. 7, Alignment Information.) TC Head Position Adjustment (7-13) Audio System Adjustment

Replacement of the CTL Head

CTL Head Zenith/Azimuth Adjustment (7-2) — CTL Head Height Adjustment (7-6) — Video Tracking Adjustment (7-5) (When the tracking adjustment is performed, adjust referring "Adjustment Steps of Tracking Adjustment" described in Sec. 7, Alignment Information.) — CTL Head Position Adjustment (7-7) — TC Head Position Adjustment (7-13)

Replacement of the Full Erase Head

Full Erase Head Zenith Adjustment (7-3) — CTL Head Zenith/Azimuth Adjustment (7-2) — CTL Head Height Adjustment (7-6) — Video Tracking Adjustment (7-5)(When the tracking Adjustment" described in Sec. 7, Alignment Information.) — CTL Head Position Adjustment (7-7) — TC Head Position Adjustment (7-13) — Audio System Adjustment

Replacement of the Gear Block

Gear Block Position Adjustment (5-5-1) → Joint Lever (2) Position Adjustment (5-4-3)

Replacement of the Entrance Roller Guide Ass'y/Exit Roller Guide Ass'y Adjust referring "Adjustment Steps of Tracking Adjustment" described in Sec. 7, Alignment Information.

Replacement of the Tension Regulator Band

Tension Regulator Operation Position Adjustment (5-4-2) Tape End Sensor Position Adjustment (5-3-3) Joint Lever (2) Position Adjustment (5-4-3) Reed Switch Position Adjustment for Tension Regulator (5-2-2) FWD Back Tension Adjustment (6-2)

Replacement of the Tension Regulator Block

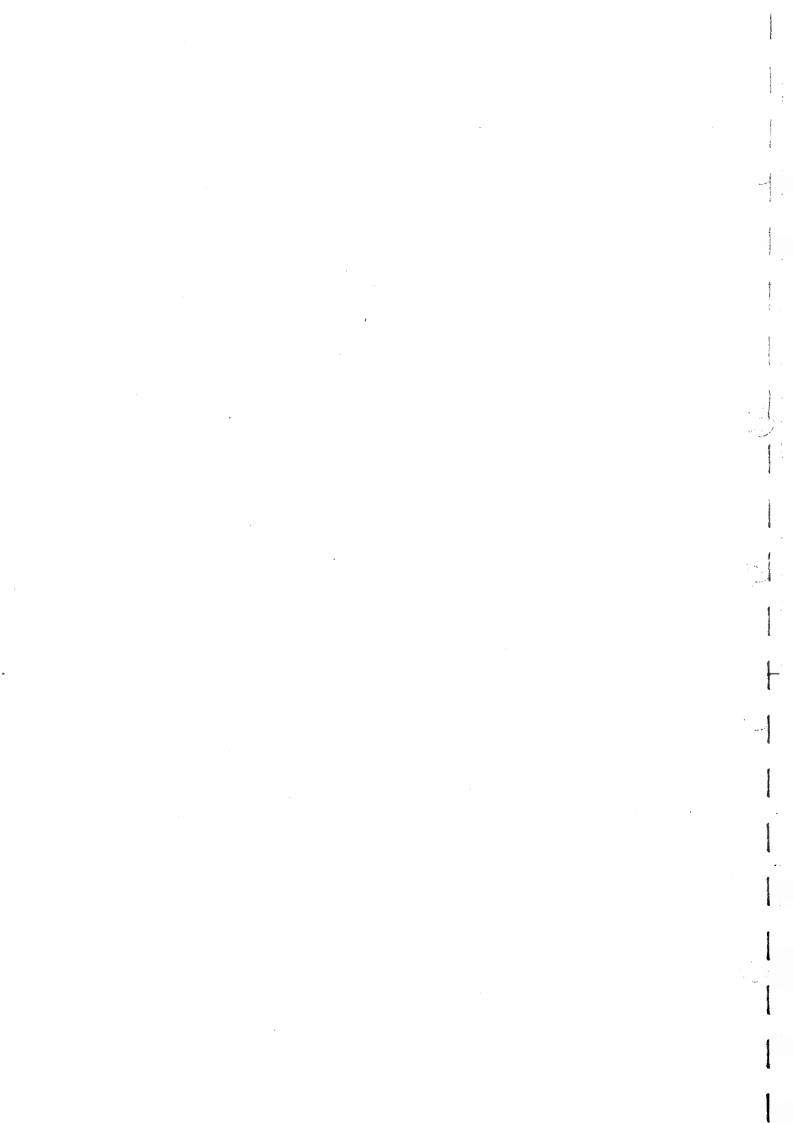
Tension Regulator Slantness Adjustment (5-4-1) —— Gear Block Position Adjustment (5-5-1) —— Tension Regulator Operating Position Adjustment for (5-4-2) —— Tape End Sensor Position Adjustment (5-3-3) —— Joint Lever (2) Position Adjustment (5-4-3) —— Reed Switch Position Adjustment for Tension Regulator (5-2-2) —— FWD Back Tension Adjustment (6-2) —— Video Tracking Adjustment (7-5) —— Adjust referring "Adjustment Steps of Tracking Adjustment" described in Sec. 7, Alignment Information.

Replacement of the Pinch Roller

Thread End Position Adjustment (5-5-3) Stopper Arm B Position Adjustment (5-5-4) Thread End Switch Position Adjustment (5-5-5)

Pinch Press Mechanism Block Position Adjustment (5-6-6)

Tape Run Adjustment Around Pinch Roller (7-1-2)



SECTION 5 LINK AND DRIVE SYSTEM ALIGNMENT

ALIGNMENT INFORMATION

MODE

. Unthreading end mode

It means EJECT completion mode.

The threading guide, tension regulator arm and pinch roller are put back at the cassette tape side completely.

. How to put the unit into the unthreading end mode.

Push the EJECT button in the threading end mode.

. Threading mode

Push the cassette-in switch and rotate the threading ring. Threading mode means that this threading ring is rotating.

. Threading end mode

Keep pressing the cassette-in switch. The threading ring rotates in the counterclockwise direction, and then stops rotation. This state means the threading end mode.

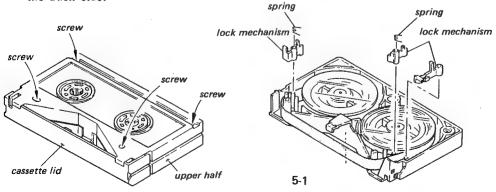
. PLAY mode without a cassette tape

- Keep pressing the cassette-in switch till the threading ring rotation is stopped.
- (2) Remove a finger from the cassette in switch, and then push the PLAY button. This state means the PLAY mode without a cassette tape.

HOW TO MAKE THE CASSETTE TAPE WITHOUT A LID

Since the VTR is designed compact size, the check and adjustment cannot be performed if cassette tape lid is installed.

- (1) Remove the four screws on the back of the cassette as shown in the figure, and remove the upper half of the cassette.
- (2) Remove the lock mechanism parts and the springs on the left and right.
- (3) Remove the cassette lid from the upper half.
- (4) Install the upper half on the lower half with four screws from the back side.



5-1. REEL TABLE HEIGHT ADJUSTMENT

- . Adjust the Reel Table so that the height of the Take-up and the Supply Reel Tables are 0.375 mm higher than the adjusted position by the limit gauge of the cassette reference plate, proper tape path can then be obtained.
- . Be sure to perform the procedure (3) in this adjustment.

Mode: Unthreading end

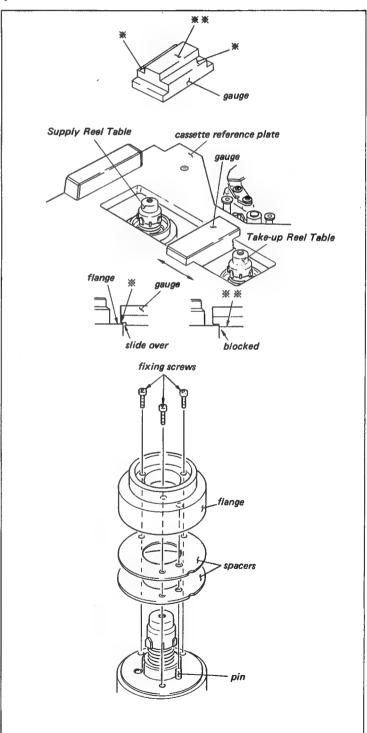
Tool: Cassette reference plate

Adjustment procedure:

- (1) Put the Cassette Reference Plate in the cassette position.
- (2) Move the gauge as shown in the figure. Check that the * marked portion of the gauge can slide over the Reel Table, while the ** marked portion is blocked, and cannot slide over Reel Table. (Check the height turning the Reel Table by hand.) If does not meet the the required specification, remove screws of flange and three fixing adjust the height of the Reel Table by varying the number of the spacers under the flange.
 - Note:. When inserting the spacers, put the hole of the flange and the pin on the Reel Table together.
 - . When checking the height, tighten the flange with three screws.
- (3) After completion of Step (2), insert a 0.125 mm and 0.25 mm thick spacers under the flange of the Supply and Take-up Reel Tables.
- (4) Tighten the flange with three screws.
 - . The spacer for adjustment:

0.125 mm thick: 2-621-040-01

0.25 mm thick : 2-621-040-11



5-2. SWITCH POSITION ADJUSTMENT

5-2-1. Cassette-up Compartment Unlock Switch Position Adjustment

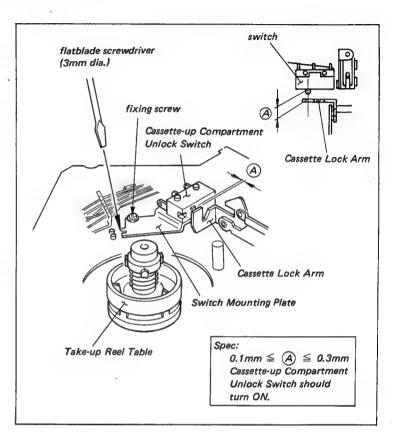
Mode: Unthreading end

Tool: Thickness gauge (0.1 mm and 0.3 mm thick)

Check procedure:

(1) Check that the clearance between the Cassette-up Compartment Unlock Switch and the Cassette Lock Arm meets the required specification.

- (1) Loosen the fixing screw of Switch Mounting Plate about 1/4 to 1/2 turn.
- (2) Adjust the position of the Switch Mounting Plate with a flatblade screwdriver (3 mm dia.) to meet the required specification.



5-2-2. Reed Switch Position Adjustment for Tension Regulator

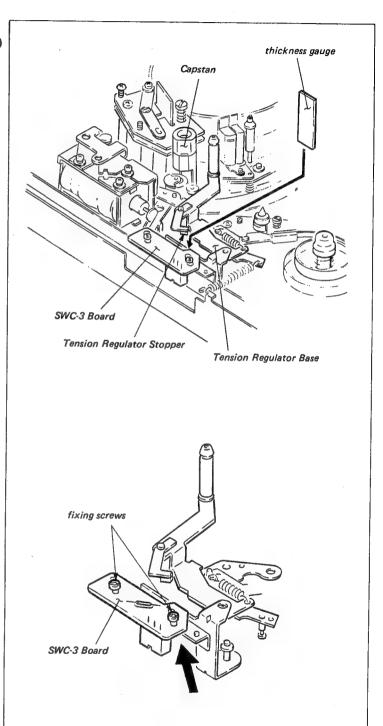
Mode: Threading end (POWER OFF)

Tool: Thickness gauge (2 mm and 2.5 mm thick)
Circuit tester

Check procedure:

- (1) Put the unit into the threading end mode, then turn the power off.
- (2) Remove the two fixing screws on the SV-94P Board, and then open the SV-94P Board.
- (3) Connect the circuit tester to pin 1 and pin 3 of the connector CN31 on the SWC-3 Board.
- (4) Insert the thickness gauge (2 mm thick) between the Tension Regulator Base and the Tension Regulator Stopper.
- (5) Check that the circuit tester indicates "H".
- (6) Insert the thickness gauge (2.5 mm thick) between the Tension Regulator Base and the Tension Regulator Stopper.
- (7) Check that the circuit tester indicates "L":
- (8) Remove the thickness gauge, and push the Tension Regulator Base to the Tension Regulator Stopper as far as it will go.
- (9) Check that the circuit tester indicates "H".

- (1) Loosen the two fixing screws of the SWC-3 Board about 1/2 to 3/4 turn.
- (2) Move the SWC-3 Board in the direction of the arrow by hand so that the position meets the required specification.



5-3. TAPE SENSOR POSITION ADJUSTMENT

5-3-1. Tape Beginning Sensor Position Adjustment (1)

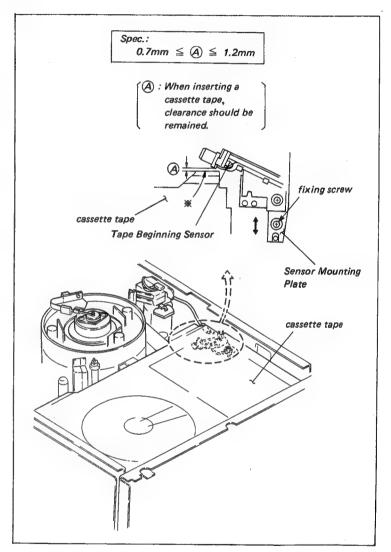
Mode: Unthreading end (POWER OFF)

Tool: Cassette tape without a lid

Check procedure:

(1) Insert the cassette tape. Check that the clearance between the ** marked portion of the cassette tape and the printed circuit board of sensor meets the required specification.

- (1) Loosen the fixing screw of Sensor Mounting Plate about 1 turn.
- (2) Adjust the position of the Sensor Mounting Plate by hand so that it meets the required specification.
- (3) After adjustment, perform the Section 5-3-2, Tape beginning sensor position adjustment (2).



5-3-2. Tape Beginning Sensor Position Adjustment (2)

. It is required that the Section 5-3-1, Tape beginning sensor position adjustment (1) is correct before initiating this adjustment.

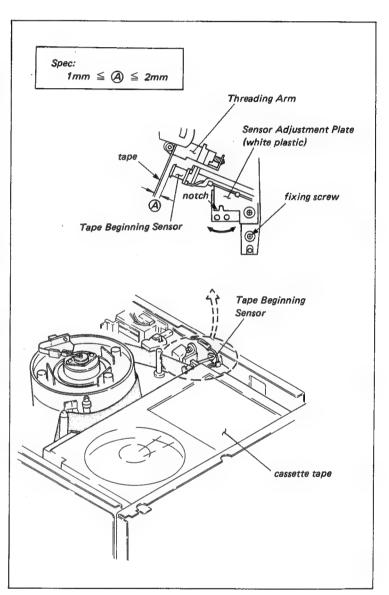
Mode: PLAY

Tool: Cassette tape without a lid

Check procedure:

- (1) Insert a cassette tape (use the beginning portion of the tape) and put into the PLAY mode.
- (2) Check that the clearance between the tape and the Tape Beginning Sensor meets the required specification.
- (3) Repeat the unthreading and threading modes two or three times and check that the Threading Arm does not hit against the Tape Beginning Sensor in the threading mode.

- (1) Loosen the fixing screw of the Sensor Adjustment Plate about 1/4 to 1/2 turn.
- (2) Insert a flatblade screwdriver (2 mm dia.) into the notch of the Adjustment Plate. Adjust the position of the Sensor Adjustment Plate so that it meets the required specification.
- (3) Confirm as described in the check procedure (3).



5-3-3. Tape End Sensor Position Adjustment

Mode: PLAY

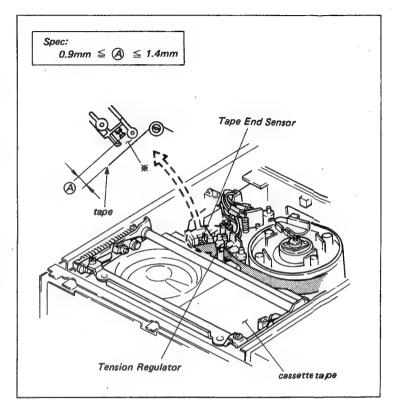
Tool: Cassette tape without a lid

Check procedure:

- (1) Insert the cassette tape (use the beginning portion of the tape) and put into the PLAY mode.
- (2) Check that the clearance between the tape and the * marked portion of the Tape End Sensor meets the required specification.

Adjustment procedure:

(1) Loosen the fixing screw of the End Sensor Block about 1/2 turn. Adjust the position of the Tape End Sensor block by hand so that it meets the required position.



5-4. TENSION REGULATOR SYSTEM ADJUSTMENT

5-4-1. Tension Regulator Slantness Adjustment

- . This adjustment is closely related with the video tracking adjustment.
- . Perform the video tracking adjustment after this adjustment.

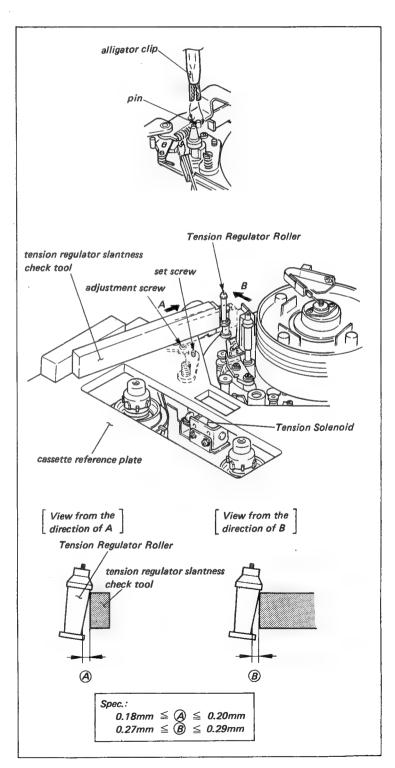
Mode: PLAY mode without a cassette tape

Tool: Cassette reference plate

Tension regulator slantness check tool Alligator clip

Check procedure:

- (1) Put the unit into the PLAY mode without a cassette tape, and then turn the power of AC adaptor OFF.
- (2) Push the Tension Regulator Arm against the S-Reel Table. Clip the Tension Regulator Arm with an alligator clip.
 - Note: . Crush the tip of the alligator clip with pliers.
 - Check that there is no clearance between the black plastic pin and the Tension Regulator Arm. (Check that the Tension Regulator Band is strained.)
- (3) Install the Cassette Reference Plate on the cassette position.
- (4) Place the Tension Regulator Slantness Check Tool against the Tension Regulator Roller from the direction of the arrows A and B. Check that the slantness of the roller meets the required specification.



- . When the slantness is incorrect viewing from the direction of the arrow B;
- (1) Adjust the slantness with the set screw.
- . When the slantness is incorrect viewing from the direction of the arrow A;
- (2) Adjust the slantness with the adjustment screw.
- (3) Confirm as described in the check procedure (4).
- (4) After adjustment, perform the following adjustments;
 - Section 5-4-2. Tension regulator operating position adjustment
 - Section 5-5-1. Gear block position adjustment
 - Section 5-4-3. Joint lever (2) position adjustment
 - Section 7-5. Video tracking adjustment

5-4-2. Tension Regulator Operating Position Adjustment

- . It is required that the Section 5-4-1, Tension regulator slantness adjustment, and Section 5-5-1, Gear block position adjustment are correct before initiating this adjustment
 - . Take care in adjustment as the drum will rotate.

Mode: PLAY mode without a cassette tape

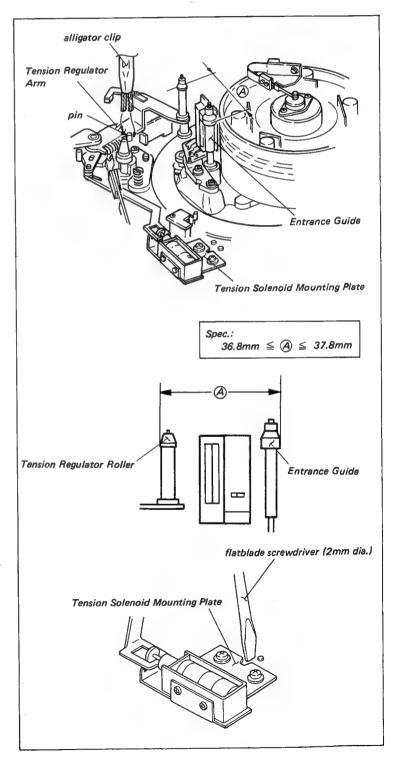
Tool: Slide vernier calliper or equivalent

Alligator clip

Check procedure:

- (1) Clip the Tension Regulator Arm and the pin with alligator clip as shown in the figure.
- (2) Check that the distance between the Flanges of the Entrance Guide and the Tension Regulator Roller meets the required specification.

- (1) Loosen the two fixing screws of the Tension Solenoid Mounting Plate about 1/3 to 1/2 turn.
- (2) Adjust the position of the Tension Solenoid Mounting Plate with a flatblade screwdriver (2 mm dia.) so that it meets the required specification.
 - Note: When turn a flatblade screwdriver (2 mm dia.) in a clockwise direction, the clearance between the Tension Regulator Roller and the Entrance Guide become narrow.
 - . When turn a flatblade screwdriver (2 mm dia.) in a counterelockwise direction, the clearance between the Tension Regulator Roller and the Entrance Guide become wide.
- After adjustment, perform the following adjustments;
 - Section 5-3-3. Tape end sensor position adjustment
 - Section 5-4-3. Joint lever (2) position adjustment.





5-4-3. Joint Lever (2) Position Adjustment

. It is required that the Section 5-4-1, Tension regulator slantness adjustment, Section 5-4-2, Tension regulator operating position adjustment, and Section 5-5-1, Gear block position adjustment are correct before initiating this adjustment.

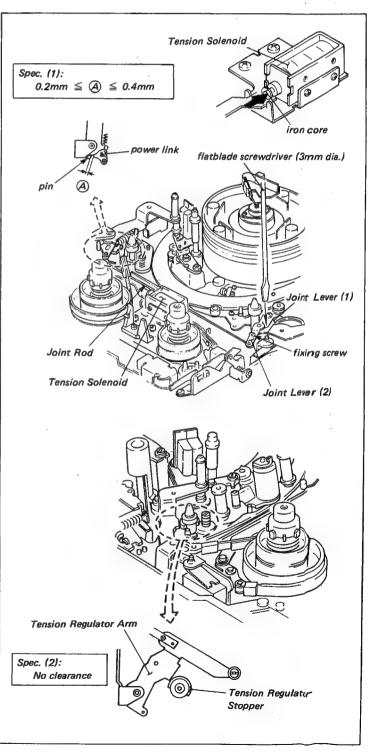
Mode: Threading end/Unthreading end

Tool: Wire clearance gauge

Check procedure:

- (1) Put the unit into the threading end mode.
- (2) Move the iron core of the Tension Solenoid into the fully energized position as far as it will go. Check that the clearance between the Power Link and the pin of the Tension Regulator Arm meets the required specification (1).
- (3) Put the unit into the unthreading end state.
- (4) Check that the Tension Regulator Arm contacts with the Tension Regulator Stopper. (Spec.2)

- (1) Loosen the fixing screw of the Joint Lever (2) about 1/4 to 1/2 turn.
- (2) Insert a flatblade screwdriver (3 mm dia.) between the Joint Lever (1) and (2). Adjust the position of the Joint Lever (2) so that it meets the required specification (1).
- (3) Check the spec.2. If the position of the Joint Lever (2) is incorrect, adjust the position of it within the limits of the spec.1.



5-5. THREADING SYSTEM ADJUSTMENT

5-5-1. Gear Block Position Adjustment

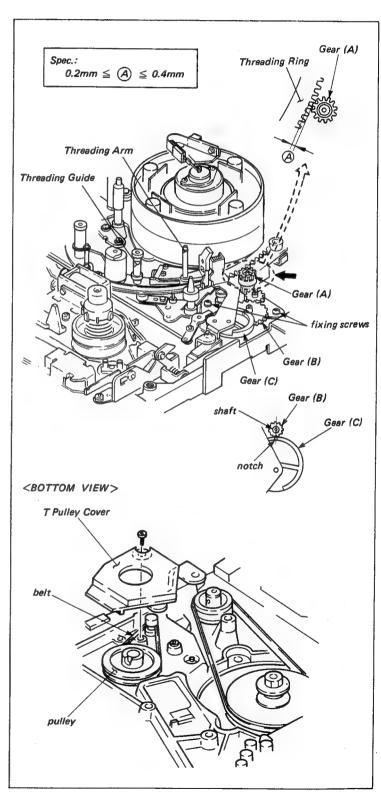
Mode: Unthreading end/Threading

Tool: Wire clearance gauge

Check procedure:

- (1) Put the unit into the unthreading end
- (2) Check that the clearance between the Gear (A) and Threading Ring meets the required specification (A).
- (3) Insert a cassette tape.
- (4) Check that the Threading Arm does not hit against the Threading Guide in the threading mode.

- (1) Put the unit into the unthreading end mode.
- (2) Remove the Battery Case.
- (3) Remove the T Pulley Cover in the back of the unit and the belt as shown in the figure.
- (4) Loosen the two fixing screws of the Gear Block about 1/4 turn from upper side of the unit. Disengage the Gear (A) from the Threading Ring.
- (5) Turn the pulley from bottom of the unit by hand so that the positional relationship between the notch of Gear (C) and the shaft of Gear (B) meets as shown in the figure.
- (6) Push the Threading Guide by finger to confirm the unthreading end mode.
- (7) Move the Gear (A) in the direction of the arrow so that it meets the required specification (A).
- (8) Turn the pulley in the back of the unit by hand. Check that the Threading Arm and the Threading Guide does not touch each other. When the Threading Arm touch against the Threading Guide, perform the following steps.
- (9) Perform adjustment procedures (1) to(6).



- (10) Disengage the Gear (A) and the Threading Ring. Turn the Gear (A) to one tooth in clockwise direction turning the pulley in the back of the unit.
- (11) Confirm as described in the adjustment procedures (7) and (8).
- (12) Clean the belt with a cloth moistened with cleaning fluid. Set the belt to the pulley. Turn the pulley by hand in counterclockwise direction to correct twist of the belt.
- (13) Install the T Pulley Cover and the battery case.
- (14) After adjustment, perform the Section 5-4-3, Joint lever (2) position adjustment.

5-5-2. Ring Stopper B Height Adjustment

Mode: Unthreading end

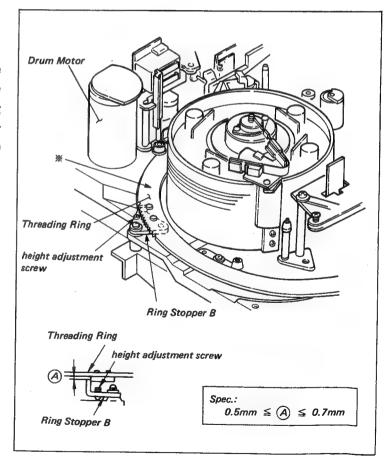
Tool: Inspection mirror

Check procedure:

(1) Lift the ** marked portion of the Threading Ring lightly. Check that the clearance between the Threading Ring and the Ring Stopper B meets the required specification with a inspection mirror for adjustment.

Adjustment procedure:

(1) Adjust the height with the adjustment screw of the Ring Stopper B so that meets the required specification.



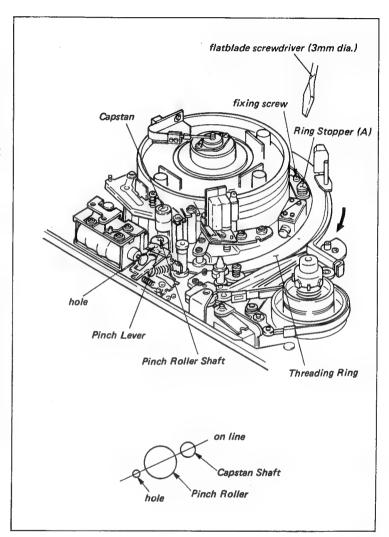
5-5-3. Thread End Position Adjustment

Mode: Threading end

Check procedure:

- (1) Put the unit into the threading end mode.
- (2) While pushing the Threading Ring in the direction of the arrow by hand, check that the center of Pinch Roller Shaft is in line with the Capstan Shaft and the hole in the Pinch Lever as shown in the figure.

- (1) Loosen the fixing screw of the Ring Stopper (A) about 1/4 to 1/2 turn.
- (2) Insert a flatblade screwdriver (3 mm dia.) between the notch of Ring Stopper (A) and the boss. While pressing the Threading Ring in the direction of the arrow by hand, adjust the position of the Ring Stopper (A) so that it meets the required specification.
- (3) Repeat the unthreading and threading mode two or three times and check that the positional relationship meets the required specification.
- (4) After adjustment, perform the Section 5-5-4, Stopper arm B position adjustment.



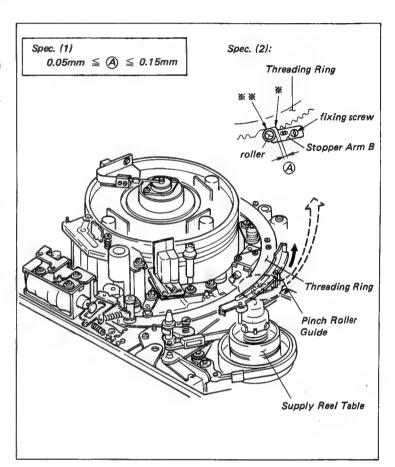
5-5-4. Stopper Arm B Position Adjustment

. It is required that the Section 5-5-3, Thread end position adjustment is correct before initiating this adjustment.

Mode: Threading end Check procedure:

- (1) Insert a flatblade screwdriver (2 mm dia.) between the Threading Ring and the Pinch Roller Guide. While turning a flatblade screwdriver, remove the Pinch Roller Guide.
- (2) While pushing the Threading Ring in the direction of the arrow by hand, check that the clearance between ** marked portion of the Threading Ring and the Roller of the Stopper Arm B meets the required specification (1).
- (3) Check that the Roller of the Stopper
 Arm B contacts with the ** marked
 portion of the Threading Ring. (spec.2)

- (1) Loosen the fixing screw of the Stopper Arm B 1/4 turn.
- (2) While pushing the Threading Ring in the direction of the arrow by hand, adjust the position of the Stopper Arm B so that it meets the required specifications (1) and (2).
- (3) Repeat the unthreading and the threading mode two or three times and check that the clearance meets the required specifications (1) and (2).
- (4) Put the unit into the unthreading mode, and then turn the power off. Install the Pinch Roller Guide.



5-5-5. Thread End Switch Position Adjustment

. It is required that the Section 5-5-4, Stopper arm B position adjustment is correct before initiating this adjustment.

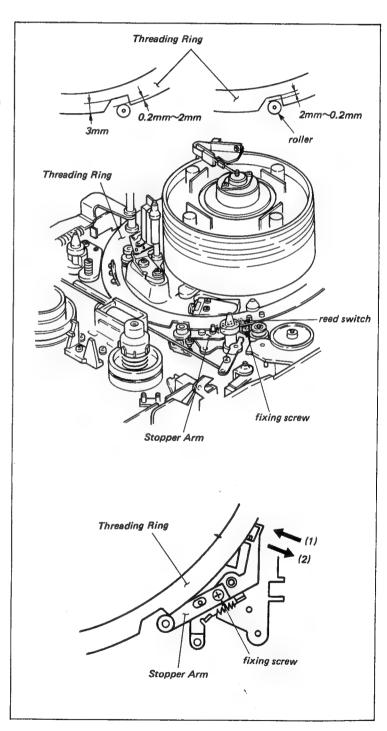
Mode: Threading end
Tool: Circuit tester
Thickness gauge

Check procedure:

- (1) Insert a flatblade screwdriver (2 mm dia.) between the Threading Ring and the Pinch Roller Guide. While turning a flatblade screwdriver, remove the Pinch Roller Guide.
- (2) Connect the circuit tester to pin 4 on CN12 on the SY-110 Board.
- (3) Turn the power ON. Check that the circuit tester indicates +5 V.
- (4) Move the Stopper Arm in the direction of the arrow (1). Check that the circuit tester indicate 0 V when the Roller is placed between 0.2 mm to 2 mm from the outer circumference of the Threading Ring. (Spec.1)
- (5) After moving the Stopper Arm direction of arrow (1), Stopper Arm in the direction arrow (2). Check that the tester indicate +5 V when the Roller is placed between 2 mm to 0.2 mm from the indented portion of the Threading Ring. (Spec.2)

Adjustment procedure:

(1) Loosen the screw 1/2 turn as shown in the figure and adjust the position of the reed switch.



5-6. PINCH PRESS MECHANISM ADJUSTMENT

5-6-1. Pinch Solenoid Position Adjustment

. This adjustment is usually not required. Proceed with the following step only when the Pinch Solenoid is replaced or removed. Remove the pinch press mechanism from the unit in this adjustment.

Check procedure:

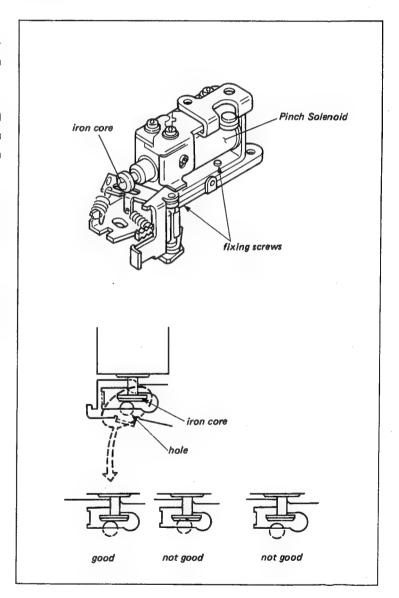
- (1) Push the iron core of the Pinch Solenoid into the fully energized position with finger.
- (2) Check that the positional relationship between the top of the iron core and the hole of the Solenoid Bracket meets the required specification as shown in the figure.

Adjustment procedure:

- (1) Loosen the fixing serews of the Pinch Solenoid, and adjust the position of the solenoid so that it meets the required specification.
- (2) After adjustment, perform the following adjustments;
 Section 5-6. All of the pinch press

mechanism adjustments

Section 7-1-2. Tape run adjustment (around the pinch roller).



5-6-2. Pinch Pressure Adjustment

. Remove the pinch press mechanism from the unit in this adjustment.

Tool: String for measurement

(Make a loop about 15 cm long as shown in the figure.)

Tension scale (500 g full scale)

Check procedure:

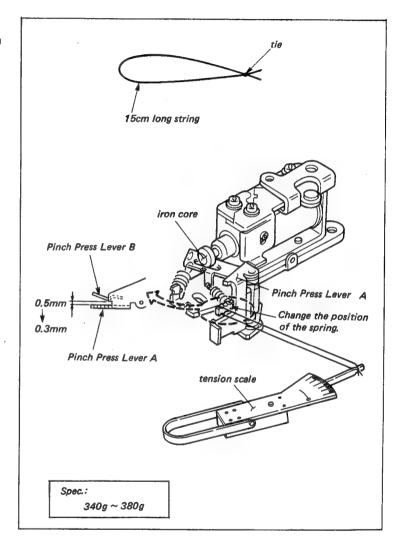
- (1) Hook the string on the Pinch Press Lever as shown in the figure and hook a tension scale on an end of the string.
- (2) While pushing the iron core of the Pinch Solenoid into the energized position with finger, move the tension scale in the right angle direction of the Pinch Press Lever.
- (3) Move the tension scale clearance between the Pinch Press Lever A and B is about 0.5 mm (visual check) and return the tension scale slowly. When the clearance 0.3 mm about (visual check) check that scale reading required specifimeets the cation.

Adjustment procedure:

- (1) Change the position of the spring as shown in the figure so that it meets the required specification.
- After adjustment, perform the following adjustments;

Section 5-6-6, Pinch press mechanism block position adjustment

Section 7-1-2, Tape run adjustment (around the pinch roller).



5-6-3. Pinch Press Lever B Position Adjustment

. This adjustment is required only when the Pinch Solenoid and the Pinch Press Lever B are replaced or removed. Remove the pinch press mechanism from the unit in this adjustment.

Check procedure:

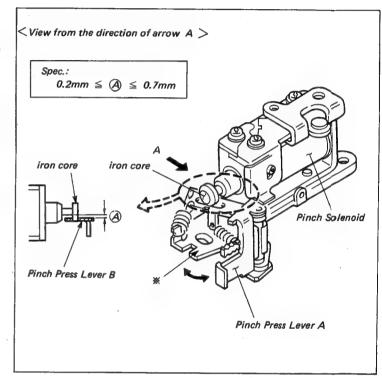
- (1) Check that the clearance between the iron core of the Pinch Solenoid and the Pinch Press Lever B meets the required specification.
- (2) When pushing A portion of the Pinch
 Press Lever in the direction of the
 arrow as far as it will go, check that
 this operation is smooth.

Adjustment procedure:

- (1) Bend the ** marked portion of the Pinch Press Lever B with pliers so that meets the required specification.
- (2) After adjustment, perform the following adjustments;

Section 5-6-6, Pinch press mechanism block position adjustment

Section 7-1-2, Tape run adjustment (around the pinch roller).



5-6-4. Arm Retainer Position Adjustment

. Remove the pinch press mechanism from the unit in this adjustment.

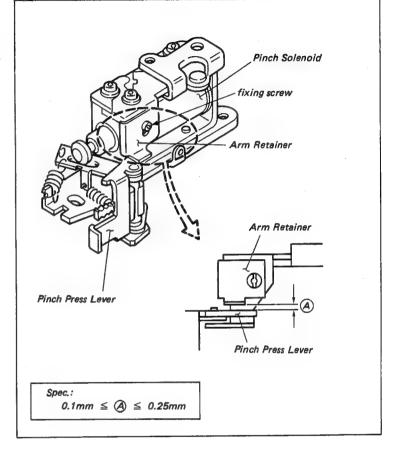
Tool: Thickness gauge

Check procedure:

(1) Check that the clearance between the Pinch Press Lever and the Arm Retainer meets the required specification.

Adjustment procedure:

 Adjust the position of the Arm Retainer to meet the required specification.

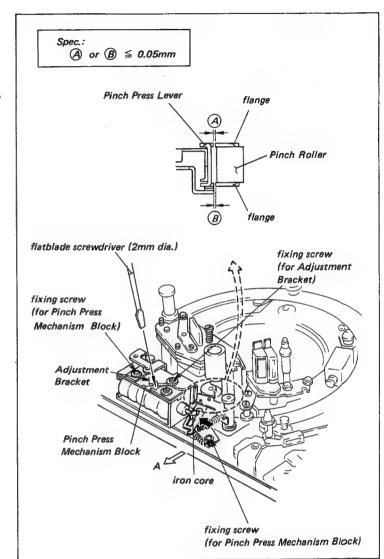




5-6-5. Pinch Press Lever Slantness Adjustment

Mode: Threading end

- (1) Remove the Tape End Sensor Block.
- (2) While pushing the Tension Regulator Arm in the direction of the Reel Table, loosen the two fixing screws of the Pinch Press Mechanism Block.
- (3) Move the Pinch Press Mechanism Block in the direction of the arrow A, then install the Pinch Press Mechanism Block with two fixing screws.
- (4) Loosen the fixing screw of the Adjusting Bracket about 1/2 turn.
- (5) Push the iron core of Pinch Solenoid in the direction of the arrow into the fully energized position.
- (6) Insert a flatblade screwdriver (2 mm dia.) into the notch of the Adjustment Bracket. Adjust the position of the Adjustment Bracket so that the clearance between the upper and lower flanges of the Pinch Roller and the Pinch Press Lever meets the required specification.
- (7) After adjustment, perform the following adjustments; Section 5-6-6, Pinch press mechanism block position adjustment. Section 5-3-3, Tape end sensor position adjustment

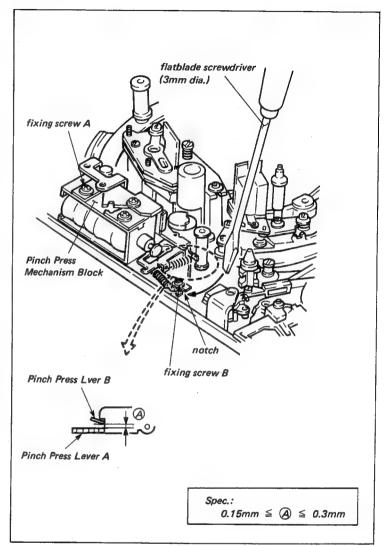


5-6-6. Pinch Press Mechanism Block Position Adjustment

Mode: PLAY mode without a cassette tape Check procedure:

- (1) Put the unit into the PLAY mode without a cassette tape.
- (2) Check that the clearance between the Pinch Press Lever A and B meets the required specification.
- (3) Repeat the unthreading and the threading completion modes (PLAY mode) two or three times, and check that the clearance meets the required specification.

- (1) While pushing the Tension Regulator Arm in the direction of the S-reel Table, loosen the two fixing screws of the Pinch Press Mechanism Block about 1/4 turn.
- (2) Adjust the position of the Pinch Press Mechanism Block with a flatblade screwdriver (3 mm dia.). Tighten the fixing screw A (screw in the rear panel side.).
- (3) Pull out the flatblade screwdriver from the notch. Tighten the fixing screw B (screw in the front panel side.).
- (4) Perform the check procedures (1) to (3).
- (5) Install the Tape End Sensor Block.
- (6) Perform the section 5-3-3, Tape end sensor position adjustment.

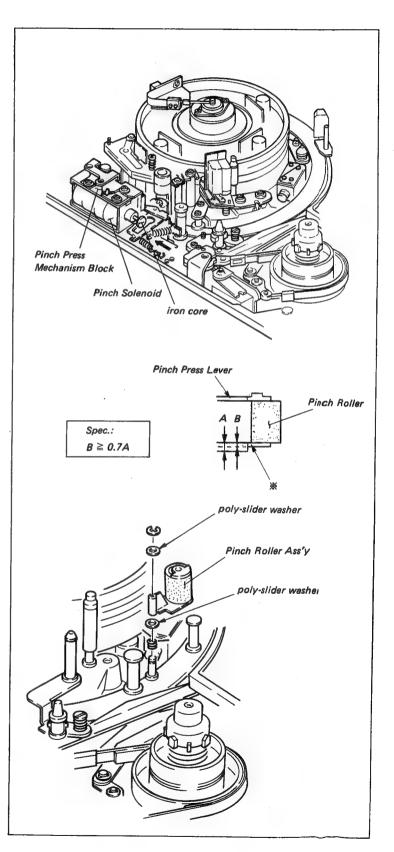


5-6-7. Pinch Press Lever Height Adjustment

Mode: Threading end Check procedure:

- (1) Remove the Tape End Sensor Block.
- (2) Push the iron core of the Pinch Solenoid slowly in the direction of the Check that the Top and Bottom arrow. Plates of the Pinch Press Lever press marked the portion of the Pinch Roller. Check that the positional relationship between the lever and the marked portion of the Pinch Roller meets the required specification.

- (1) Put the unit into the unthreading end mode.
- (2) Replace the poly-slider washer under the Pinch Roller Ass'y so that it meets the required specification. Poly-slider washer for adjustment; 3-701-436-01 1.6 mm dia. 0.13 mm thick 3-701-436-11 1.6 mm dia. 0.25 mm thick
- 3-701-436-21 1.6 mm dia. 0.5 mm thick
 (3) After replacement, check the vertical play of the Pinch Roller as described in Section 5 so that it meets the required specification.
- (4) Install the Tape End Sensor Block. Perform the section 5-3-3, Tape end sensor position adjustment.



SECTION 6 TORQUE AND BACK TENSION ALIGNMENT

ALIGNMENT INFORMATION

MODE

Threading end mode

Keep pressing the cassette-in switch till the threading ring rotation is stopped.

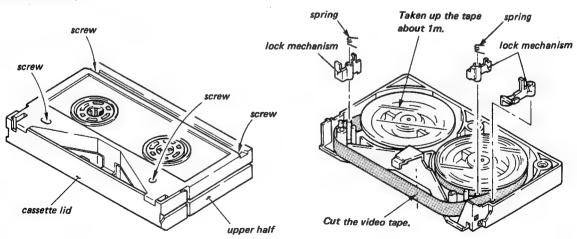
This state means the threading end mode.

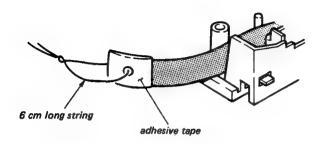
HOW TO MAKE THE LOCALLY-PRODUCED-TAPE

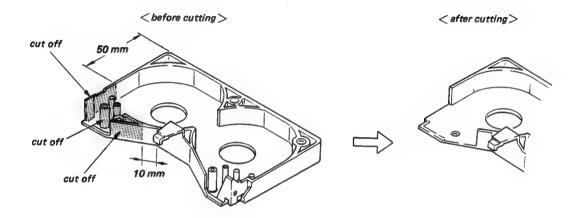
This tape is used for the FWD back tension adjustment. Prepare this tape as follows:

- (1) Wind the BCT-20K cassette tape to the tape beginning portion.
- (2) Remove the four fixing screws from the back of the cassette tape. While releasing the lock of the cassette lid, remove the upper half of the cassette.
- (3) Remove the lock mechanism parts and the springs on the left and right.
- (4) Take up the video tape on the take-up reel about 1 meter. Cut the video tape at the position as shown in the figure. Remove the take-up reel from the cassette.
- (5) Attach an adhesive tape on an end of the tape at the supply side and make a hole on the adhesive tape.
- (6) Make a loop of 6 cm long string through the hole.
- (7) Remove once the supply reel from the lower half.
- (8) Cut off the lower half at the position as shown in the figure with nippers.
- (9) Put the supply reel on the lower half.

locally-produced-tape







6-1. FWD BACK TENSION ADJUSTMENT

Tool: Tension scale

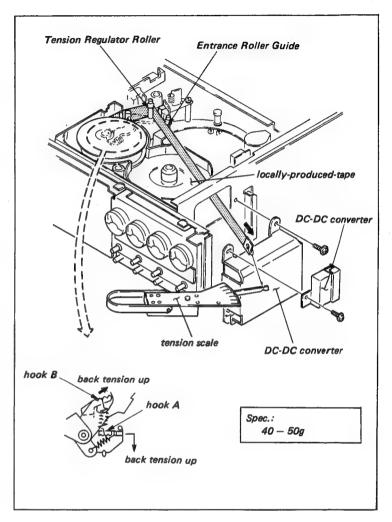
Locally-produced-tape

(Refer to alignment information.)

Check procedure:

- Remove the four fixing screws from the Connector Panel, and open the Connector Panel.
- (2) Remove the two fixing screws from the DC-DC converter.
- (3) Remove the DC-DC converter once as shown in the figure.
- (4) Install the locally-produced-tape on the unit in the threading completion mode.
- (5) Thread the cassette tape and hook a tension scale on to an end of the tape.
- (6) While holding the cassette lower half so that the cassette half does not rise, put the unit into the PLAY mode.
- (7) Pull out the tape at a constant speed of approx. 12 cm/sec. in the direction of the arrow. Check that the scale reading meets the required specification.

- (1) Change the spring position of the spring hook at A side so that it meets the required specification.
- (2) If does not meet the specification in Step (1), change the spring position of the spring hook at B side.



SECTION 7 TAPE RUN ALIGNMENT

ALIGNMENT INFORMATION

ALIGNMENT TAPE

. Alignment tape for tracking adjustment

There are two types alignment tape for tracking adjustment.

- (1) Tracking tape, CR2-1BPS (8-960-096-51)
- (2) Tracking tape, CR2-1PS (8-960-098-02)
- . Alignment tape for general adjustment

There are three types alignment tape for general adjustment.

- (1) CR5-1B PS (8-960-096-91)
- (2) CR8-1B PS (8-960-096-86)
- (3) CR5-2A PS (96-0098-44)

MODE

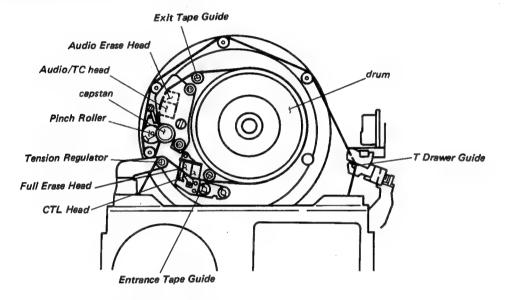
. Unthreading end mode

It means EJECT completion mode.

The threading guide, tension regulator arm and threading ring are put back at the cassette tape side completely.

THE LOCATION OF HEADS AND TAPE GUIDES

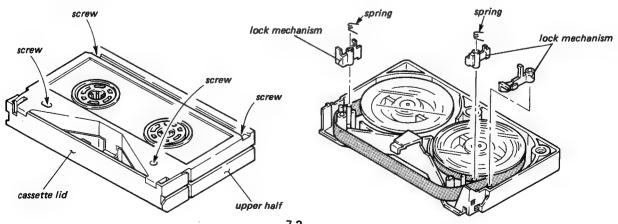
The heads and tape guides are located as follows;



HOW TO MAKE THE CASSETTE TAPE WITHOUT A LID

Since the VTR is designed compact size, the check and adjustment cannot be performed if cassette tape lid is installed.

- (1) Remove the four screws on the back of the cassette as shown in the figure, and remove the upper half of the cassette.
- (2) Remove the lock mechanism parts and the springs on the left and right.
- (3) Remove the cassette lid from the upper half.
- (4) Install the upper half on the lower half with four screws from the back side.



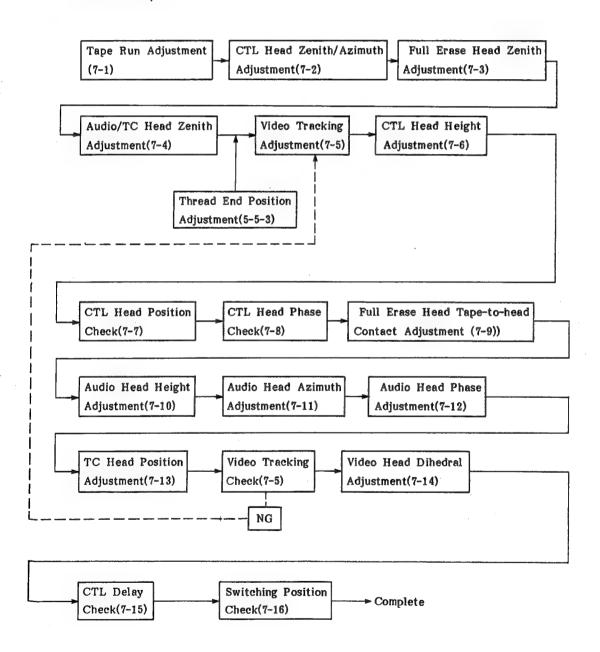
HOW TO MAKE THE ALIGNMENT TAPE WITHOUT A LID

Since the VTR is designed compact size, the check and adjustment cannot be performed if the alignment tape lid is installed.

Remove the lid of the alignment tape CR2-1PS and CR2-1BPS for the tracking adjustment referring "How to make the cassette tape without a lid".

ADJUSTMENT STEPS OF TRACKING ADJUSTMENT

Perform the tracking adjustment of Video, Audio, CTL and Time Code Heads as follows:



7-1. TAPE RUN ADJUSTMENT

7-1-1. Tape Run Adjustment (T Drawer Guide Slantness Adjustment)

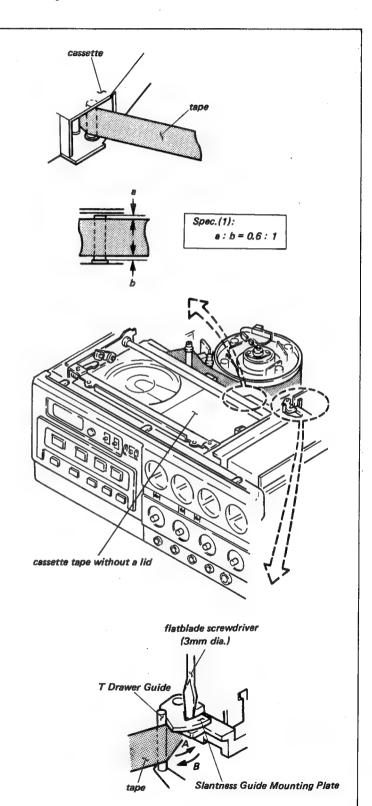
Mode: PLAY

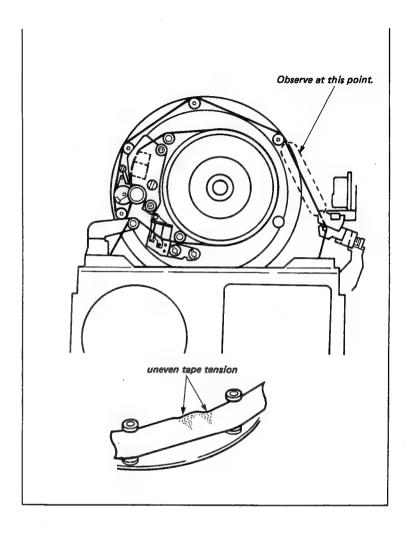
Tool: Cassette tape without a lid

Check procedure:

- (1) Insert a cassette tape and put the unit into the PLAY mode. (Never use the alignment tape.)
- (2) Check that the positional relationship between the tape and the tape guide at the take-up side of the cassette tape as shown in the figure. (Spec.1)
- (3) Turn the PAUSE mode ON/OFF. Observe the surface of the running tape very carefully. Check that the tape tension is exactly equal at the top and bottom of the tape. (Spec.2)
- (4) Perform Step (3) four or five times.

- (1) Adjust the position of the Slantness Guide Mounting Plate so that it meets the required specifications (1) and (2).
- When the tape runs at the upper portion of the Tape Guide, move the Slantness Guide Mounting Plate in the direction of A by hand.
- When the tape runs at the lower portion of the Tape Guide, move the Slantness Guide Mounting Plate in the direction of B with a flatblade screwdriver (3 mm dia.).
- When the tape tension meets the Spec.(1),
 a bit of uneven tape tension at the top
 or the bottom of the tape is acceptable.





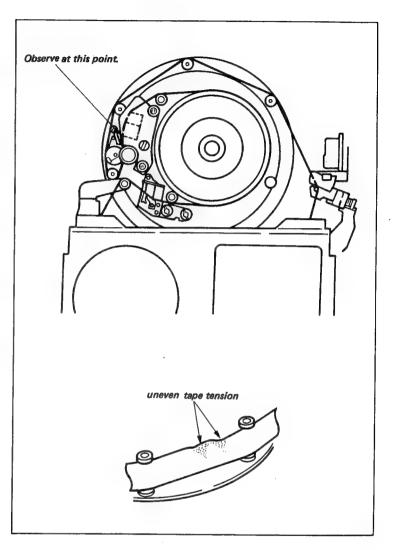
7-1-2. Tape Run Adjustment Around Pinch Roller

Mode: PLAY

Check procedure:

- (1) Insert a cassette tape and put the unit into the PLAY mode. (Never use the alignment tape.)
- (2) Observe the surface of the running tape between the Audio Head and the capstan very carefully. Check that the tape tension is exactly equal at the top and the bottom of the tape.
- (3) Turn the PAUSE mode ON/OFF. Check that the tape tension is exactly equal at the top and bottom of the tape.

- (1) Perform the Section 7-4, Audio/TC head zenith adjustment.
- (2) If the specification cannot be met by Step (1), replace the Pinch Roller Block. Perform the Section 5-5-3, Thread end position adjustment.
- (3) Perform the check procedures.



7-2. CTL HEAD ZENITH/AZIMUTH ADJUSTMENT

Mode: Threading end

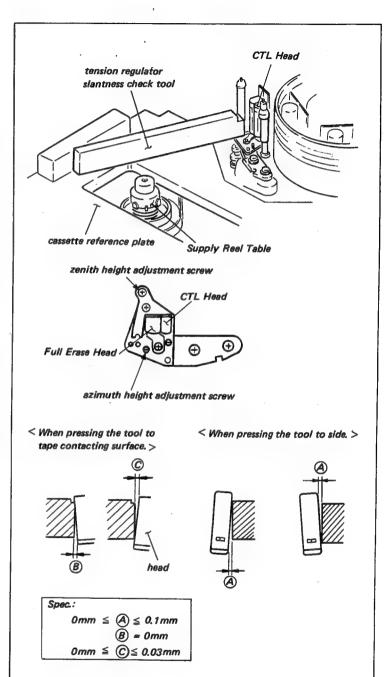
Tool: Cassette reference plate

Tension regulator slantness check tool

Check procedure:

- (1) Install the cassette reference plate on the cassette position.
- (2) Place the tension regulator slantness check tool at the front of the CTL Head lightly. Check that the zenith of the CTL Head meets the required specification.
- (3) Place the tension regulator slantness check tool at the side of the CTL Head as shown in the figure. Check that the azimuth of the CTL Head meets the required specification.

- Adjust the clearances B and C so that it meets the required specification with the zenith height adjustment screw.
- (2) Adjust the clearance A so that it meets the required specification with the azimuth height adjustment screw.



7-3. FULL ERASE HEAD ZENITH ADJUSTMENT

Mode: Threading end

Tool: Cassette reference plate

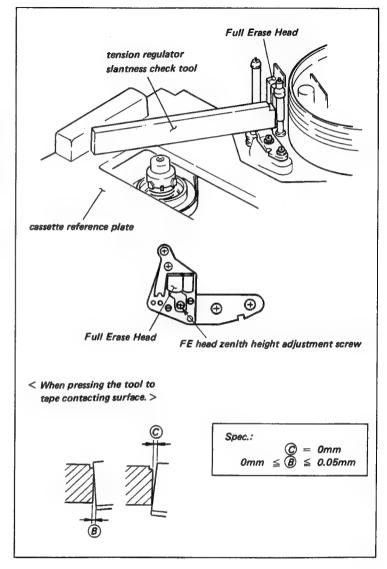
Tension regulator slantness check tool

Check procedure:

- (1) Install the cassette reference plate on the cassette position.
- (2) Place the tension regulator slantness check tool at the front side of the Full Erase Head as shown in the figure. Check that the zenith of the Full Erase Head meets the required specification.

Adjustment procedure:

(1) Adjust the zenith so that it meets the required specification with the FE head zenith height adjustment screw.



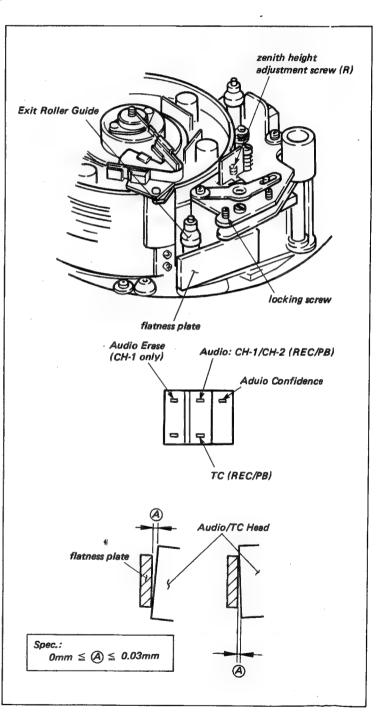
7-4. AUDIO/TC HEAD ZENITH ADJUSTMENT

. Audio/TC Head Block is comprised of the Audio Head, Time Code Head, Audio Confidence Head and Audio Erase Head.

Mode: Unthreading end Tool: Flatness plate Check procedure:

(1) Check that the clearance between the head and the flatness plate meets the required specification, when installing the flatness plate on the Audio/TC Head and the Exit Roller Guide.

- . When there is a clearance at the bottom portion.
- (1) Loosen the locking screw about 1/4 to 1 turn.
- (2) Turn the zenith height adjustment screw (R) in the clockwise direction so that the zenith meets the required specification.
- (3) Tighten the locking screw and check the zenith again.
- . When there is a clearance at the top portion.
- (4) Loosen the locking serew about 1/4 to 1 turn.
- (5) Turn the zenith height adjustment screw (R) in the counterclockwise direction so that the zenith meets the required specification.
- (6) Tighten the locking screw and check again.



7-5. VIDEO TRACKING ADJUSTMENT

Mode: Playback the alignment tape Tool: Alignment tape, CR2-1BPS

Oscilloscope

Inspection mirror

PB amplifier tool

Preparation:

- (1) Disconnect CN403 of the VRA-1 Board.
- (2) Connect the connector of the harness to the INPUT connector of the PB amplifier tool.
- (3) Disconnect CN10 of the MB-157 Board.
- (4) Connect the OUTPUT connector of the PB amplifier tool to CN10 of the MB-157 Board.
- (5) Disconnect the connector of the brush on the Drum. Connect the connector of the harness to 3P connector of the PB amplifier tool.
- (6) Short between TP16 and GND on the SV-94P Board with a shorting clip.
- (7) Short between pin8 of CN12 and GND on the SV-94P Board with a shorting clip.
- (8) Remove the MDM-3P Board and extend it with an extension board.
- (9) Connect the oscilloscope as follows; CH-1:TP301/MDM-3P Board EXT. TRIG:TP308/MDM-3P Board
- (10) Tap the bottom of the alignment tape on a hard surface lightly two or three times so that the tape is positioned to the lower side in the reel hub of the cassette tape. (For stable video tracking adjustment)
- (11)Play back the alignment tape.

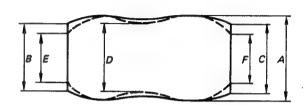
Check procedure:

- (1) When turning the TRACKING volume, check that the RF waveform maintains a flat envelope while the amplitude increases and decreases.
- (2) Turn the TRACKING volume, so that the RF envelope waveform has the maximum amplitude.

Check that the RF envelope waveform fluctuation and the tape-to-head contact are within the specification.

(3) Check that the type curls at the Tension Regulator, Entrance Guide and Exit Guide meet the required specification.

< PLAY Mode >



Spec.:

head-to-tape contact

$$\frac{B}{A} \ge 0.8 \quad \frac{C}{A} \ge 0.8$$

fluctuation

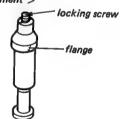
$$\frac{D}{A} \ge 0.9$$
 $\frac{E}{B} \ge 0.9$ $\frac{F}{C} \ge 0.9$

< FWD or REV SEARCH Mode >

Spec:

The RF waveform of entrance side meets the specification at the SEARCH mode.

< Tape Guide Adjustment >



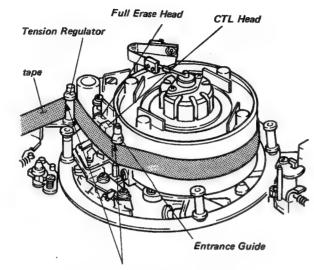
(4) Put the unit into the FWD and REV SEARCH mode. Check that the tapeto-head contact is within the specification.

- . When adjusting the tape guide height.
- (a) Loosen the locking screw about 2 to 3 turns.
- (b) Turn the flange and adjust the height.
- (c) After the adjustment, tighten the locking screw and check again.
- . When the tracking at the drum entrance side is not good.
- (1) Make the RF envelope amplitude 70 to 80% of the maximum amplitude by turning the TRACKING volume.
- (2) Loosen the locking screw of the Entrance Guide. Turn the flange of the Tape Guide so that the tape does not contact with the flange.
- (3) Adjust the height of the roller guide of the Tension Regulator so that the tape runs in contact with the upper flange and RF envelope is flat simultaneously.
- (4) Adjust the height of the Entrance Guide so that it meets the following requirements.
 - . Tape should run without any tape curl at the upper flange of the Tension Regulator.
 - . Tape should run in contact with the lead of the Drum.
 - . RF envelope waveform should be flat.
 - . Tape should run in contact with the upper flange of the Entrance Guide.

 (Acceptable range of the tape curl at the upper flange is less than 1/10 of the tape width.)
- (5) Put the unit into the FWD and REV SEARCH mode. Check that the tape runs without any tape curl at the flanges of the Tension Regulator and the Entrance Guide and at the lead of the Drum.

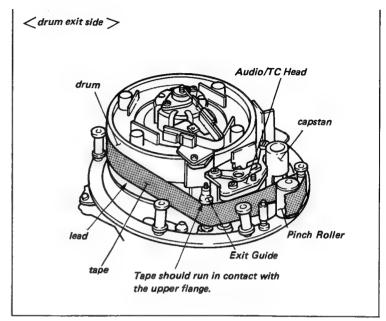
 (Acceptable range of the tape curl at the upper flange of the Entrance Guide is less than 1/10 of the tape width.)





Tape should run in contact with the upper flange.

- (6) Repeat the Steps (1) to (5) so that meets the required specification.
- . When the tracking at the drum's exit side is not good.
- (7) Make the RF envelope waveform 70 to 80% of the maximum amplitude by turning the TRACKING volume.
- (8) Adjust the height of the Exit Guide so that the tape runs in contact with the lead of the Drum and RF envelope is flat simultaneously.
 - (Acceptable range of the tape curl at the upper flange of Exit Guide is less than 1/10 of the tape width.)
- (9) Put the unit into the FWD and REV SEARCH mode. Check that the tape runs without any tape curl at the flange of the Exit Guide and the lead of the Drum. (Acceptable range of the tape curl at the upper flange of Exit Guide is less than 1/10 of the tape width.)
- (10) Perform the check procedures again.



7-6. CTL HEAD HEIGHT ADJUSTMENT

Mode: Playback the alignment tape
Tool: Alignment tape, CR8-1BPS
Oscilloscope

Preparation:

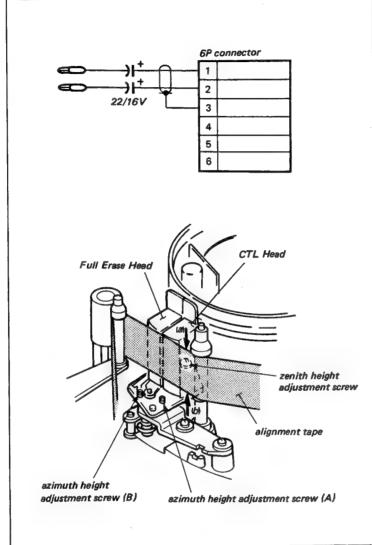
- (1) Make the special connector as shown in the figure.
- (2) Disconnect the CN3 on the AU-93P Board.
- (3) Connect the special connector as follows;
 - . Connect the clip from pin 1 to pin 1 of IC3 on the SV-94P Board.
 - . Connect the clip from pin 2 to pin 4 of IC3 on the SV-94P Board.
 - . Connect the 6P connector to CN3 on the AU-93P Board.
- (4) Connect the oscilloscope to the AUDIO CH-1 OUT connector on the connector panel.
- (5) Insert the alignment tape. Playback the audio 1 kHz signal portion recorded on the CTL track on the alignment tape.

Check procedure:

(1) When pressing down the tape at (a) portion, or when pushing up the tape at (b) portion, check that the levels both decrease. If the levels increase, the following adjustments are necessary.

Adjustment procedure:

- . When the levels increase while pressing down the tape at (a) portion.
- (1) Turn the azimuth height adjustment screws (A) and (B) in the clockwise direction. Turn the zenith height adjustment screw an exactly equal amount in the counterclockwise direction. Adjust the maximum output waveform.
- . When the levels increase while pushing up the tape at (b) portion.
- (2) Turn the azimuth height adjustment screws (A) and (B) in the counterclockwise direction. Turn the zenith height adjustment screw an exactly equal amount in the clockwise direction. Adjust the maximum output waveform.
- (3) Remove the check tools.



7-7. CTL HEAD POSITION ADJUSTMENT

Mode: Playback the alignment tape
Tool: Alignment tape, CR2-1BPS
Dual trace oscilloscope
PB amplifier tool

Preparation:

- Connect the video signal to the VIDEO IN terminal on the Connector Panel.
- (2) Disconnect CN403 of the VRA-1 Board.
- (3) Connect the connector of the harness to the INPUT connector of the PB amplifier tool.
- (4) Disconnect CN10 of the MB-157 Board.
- (5) Connect the OUTPUT connector of the PB amplifier tool to CN10 of the MB-157 Bard.
- (6) Disconnect the connector of the brush on the Drum. Connect the connector of the harness to 3P connector of the PB amplifier tool.
- (7) Short between TP16 and GND on the SV-94P Board with a shorting clip.
- (8) Remove the MDM-3P Board and extend it with an extension board.
- (9) Connect the oscilloscope as follows; CH-1:TP301/MDM-3P Board CH-2:TP308/MDM-3P Board EXT. TRIG:TP308/MDM-3P Board
- (10) Play back the alignment tape.

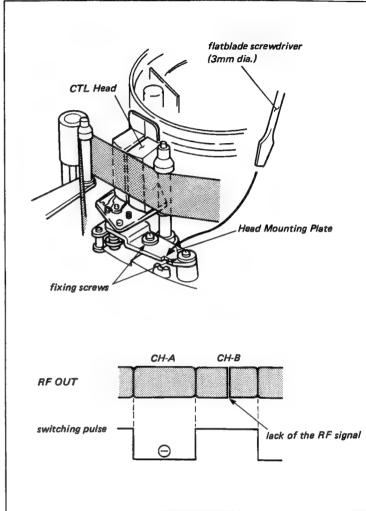
Adjustment procedure:

- (1) Turn the TRACKING volume to the clicked position.
- (2) Loosen the two fixing screws about 1/4 to 1/2 turn. Insert a flatblade screw driver (3 mm dia.) into the notch of the Head Mounting Plate and adjust the maximum ounput at the center of the waveform.
- (3) Remove the video signal after the fixing screw is fighteved, short between pin 8 of CN12 on the SV-94P board and GND with a shorting clip.

Turn the TRACKING volume so that the RF envelope waveform has the maximum amplitude.

Check that the level of the RF envelope waveform is the same level as the above procedure (2).

(4) Remove the tool and the shorting clip.



7-8. CTL HEAD PHASE CHECK

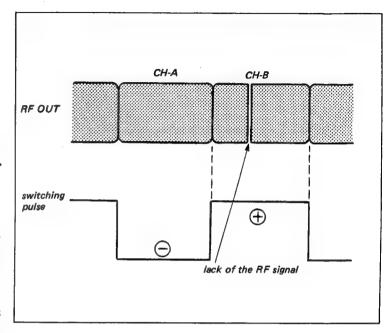
Mode: Playback the alignment tape
Tool: Alignment tape, CR2-1BPS
PB amplifier tool
Dual trace oscilloscope

Preparation:

- (1) Disconnect the CN403 of the VRA-1 Board.
- (2) Connect the connector of the harness to the INPUT connector of the PB amplifier tool.
- (3) Disconnect CN110 of the MB-157 Board.
- (4) Connect the OUTPUT connector of the PB amplifier tool to CN110 of the MB-157 Board.
- (5) Disconnect the connector of the brush on the Drum. Connect the connector of the harness to 3P connector of the PB amplifier tool.
- (6) Short between TP16 and GND on the SV-94P Board with a shorting elip.
- (7) Connect the oscilloscope as follows; CH-1: TP301/MDM-3P Board CH-2: TP308/MDM-3P Board EXT. TRIG: TP308/MDM-3P Board
- (8) Play back the alignment tape.

Check procedure:

(1) Check that the waveform of TP301 and TP308 meets the required specification.



7-9. FULL ERASE HEAD TAPE-TO-HEAD CONTACT ADJUSTMENT

Mode: PLAY

Tool: Cassette tape, BCT-20K

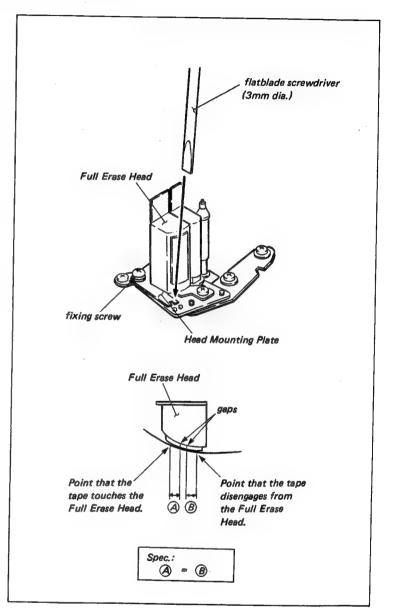
Check procedure:

- (1) Insert a cassette tape, and put the unit into the PLAY mode.
- (2) When ovserving the FE Head from right above, check that the amount of overlap

 (A) is equal to the amount of overlap

 (B)

- (1) Loosen the fixing screw of the FE Head 1/2 to 1 turn.
- (2) Insert a flatblade screwdriver (3 mm dia.) into the notch of the Head Mounting Plate. Adjust so that the amount of overlap meets the specification
- (3) Tighten the fixing screw, and check again.



7-10. AUDIO HEAD HEIGHT ADJUSTMENT

Mode: Playback the aslignment tape
Tool: Alignment tape, CR8-1BPS
Dual trace oscilloscope

Preparation:

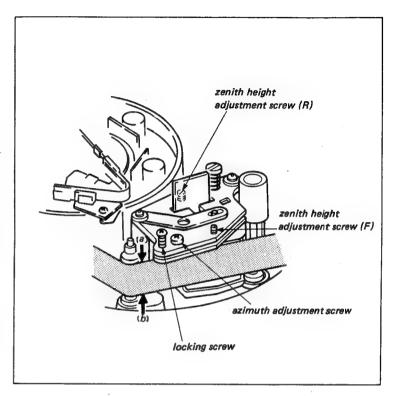
- (1) Connect the oscilloscope as follows; CH-1: AUDIO OUT CH-1/connector panel CH-2: AUDIO OUT CH-2/connector panel
- (2) Insert the alignment tape, and play back the audio 1kHz signal which is recorded on the end of the alignment tape.

Note: Be sure not to play back the 1kHz signal which is recorded on the beginning portion of the alignment tape.

Check procedure:

- (1) Check that the output level decreases when pressing down at (a) portion.
- (2) Check that the output level decreases when pushing up at (b) portion.

- . When the output level increases while pressing down at (a).
- (1) Loosen the locking screw. Adjust the maximum output by turning the zenith height adjustment screws (R) and (F) exactly equal amounts in counterclockwise direction and turn the azimuth adjustment screw of an exactly equal amount in clockwise direction.
- (2) After the adjustment, tighten the locking screw, and check again.
- . When the level increases while pushing up at (b).
- (3) Adjust the maximum output by turning the zenith height adjustment screws (R) and (F) exactly equal amounts in clockwise direction and turn the azimuth adjustment screw an exactly equal amount in counterclockwise direction.
- (4) After the adjustment, tighten the locking screw, and check again.



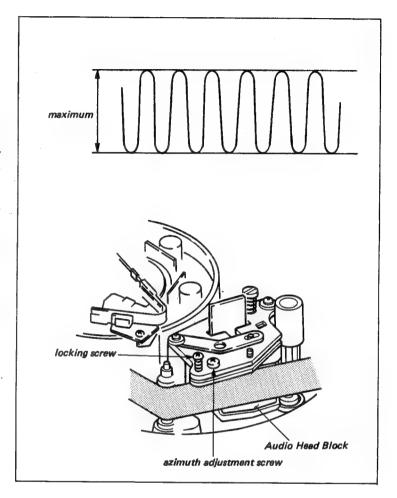
7-11. AUDIO HEAD AZIMUTH ADJUSTMENT

Mode: Playback the alignment tape
Tool: Alignment tape, CR8-1BPS
Dual trace oscilloscope

Preparation:

- (1) Connect the oscilloscope as follows; CH-1: AUDIO OUT CH-1/connector panel CH-2: AUDIO OUT CH-2/connector panel
- (2) Insert the alignment tape, and play back the audio 15 kHz portion.

- (1) Loosen the fixing screw about two or three turns.
- (2) Turn the azimuth adjustment screw so that the output waveform has the maximum amplitude.
- (3) Tighten the fixing serew, and check again.



7-12. AUDIO HEAD PHASE ADJUSTMENT

Mode: Playback the alignment tape
Tool: Alignment tape, CR8-1BPS
Dual trace oscilloscope

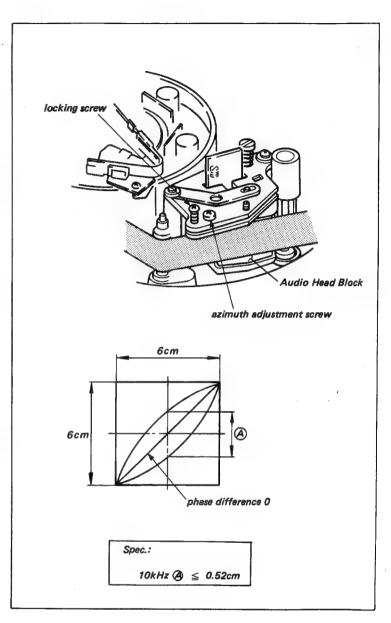
Preparation:

- Connect the HORIZONTAL and VERTICAL terminals of oscilloscope to the AUDIO OUT CH-1 and CH-2 connectors.
- (2) Insert the alignment tape, and play back the audio 15 kHz portion.
- (3) Adjust the scope for horizontal and vertical amplitudes of 6 cm of a lissajous waveform.

Check procedure:

(1) Check that the vertical amplitude at the center in the horizontal direction is within the specification.

- (1) Loosen the locking screw about 1/4 to 1/2 turn.
- (2) Adjust the phase by turning the azimuth adjustment screw so that it meets the required specification.
- (3) Tighten the locking screw and check again.



7-13. TC HEAD POSITION ADJUSTMENT

. It is required that the Section 7-7, CTL head position adjustment is correct before initiating this adjustment.

Mode: Playback the alignment tape

Tool: Alignment tape, CR2-1BPS

Dual trace oscilloscope

Eccentricity driver (4 mm dia.)

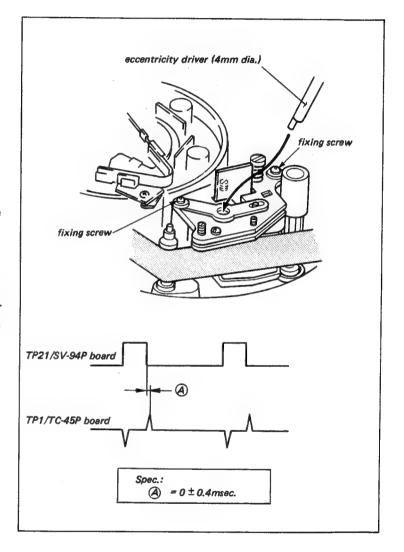
Preparation:

- (1) Connect the oscilloscope as follows; CH-1: TP1/TC-45P Board CH-2: TP21/SV-94P Board
- (2) Play back the alignment tape.

Check procedure:

(1) Check that the waveform meets the required specification.

- (1) Loosen the fixing screws.
- (2) Adjust the position of the TC head so that it meets the required specification with the eccentricity driver (4 mm dia.).



7-14. VIDEO HEAD DIHEDRAL ADJUSTMENT

7-14-1. Video PB Head Dihedral Adjustment

- . Perform this adjustment only for the Y head.
- . As the reference head is CH-A, perform the adjustment in CH-B.

Mode: Playback the alignment tape

Tool: Alignment tape, CR5-2A PS

Monitor TV

Dihedral adjustment screw (tow pieces)

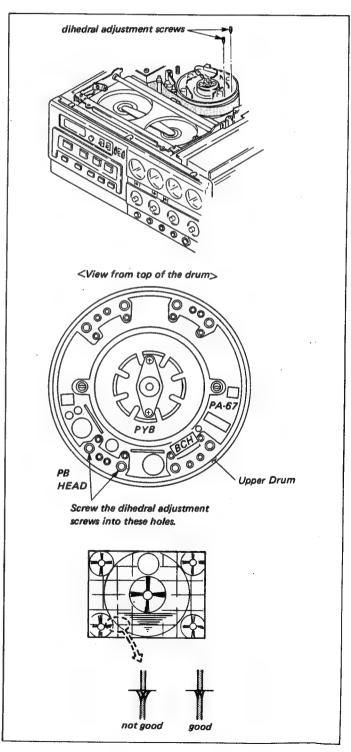
Preparation:

- (1) Connect the monitor TV to the Connector Panel.
- (2) Insert the alignment tape and play back the monoscope signal of the alignment tape (for dihedral adjustment).

Check procedure:

(1) Check the vertical line beneath the switching point visually on a monitor. If the vertical line does not split into two lines, it meets the specification.

- (1) Screw the two dihedral adjustment screws into the adjustment holes as shown in the figure until some resistance is felt.
- (2) If this screw is turned further, the video head is moved and the dihedral is adjusted. Therefore, turn this screw an additional quarter turn.
- (3) Play back the alignment tape, and check the dihedral distortion. If the distortion has become worse, loosen this adjustment screw about one turn. Tighten the other adjustment screw (on the opposite side of the video head) so that the distortion meets the specification.
- (4) Remove the two dihedral adjustment screws. Play back the alignment tape, and check the dihedral again.



7-14-2. Video REC Head Dihedral Adjustment

- . It is required that the Sec. 7-14-1, Video PB head dihedral adjustment is correct before initiating this adjustment.
- . Perform this adjustment only for the Y head.

Mode: REC/PB

Tool: Cassette tape, BCT-20K

Monitor TV

Dihedral adjustment screw (two pieces)

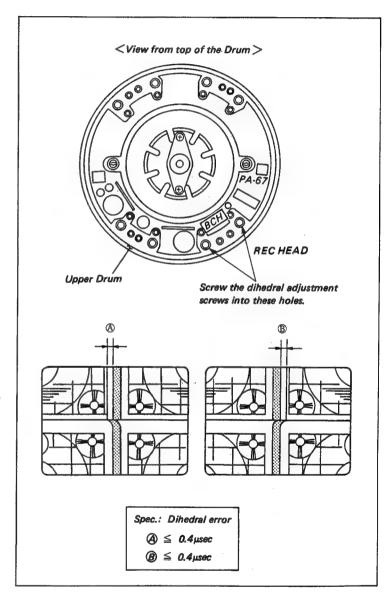
Preparation:

- (1) Connect the monitor TV to the VIDEO OUT terminal on the Connector Panel.
- (2) Connect the video signal to the VIDEO IN terminal on the Connector Panel.
- (3) Put the monitor TV into the pulse-cross mode.
- (4) Insert a cassette tape.

Check procedure:

- (1) Record the video signal.
- (2) Play back the video signal.
- (3) Check that the distortion of the sync meets the specification.

- (1) Screw the two dihedral adjustment screws into the adjustment holes as shown in the figure until some resistance is felt.
- (2) When turning the adjustment screw further, the dihedral can be adjusted.
- (3) Perform the check procedures (1) and(2). Check that the distortion of the sync meets the specification.
- When the distortion of the sync increases after the adjustment.
- (4) Loosen the dihedral adjustment screw about one turn.
- (5) Tighten the other adjustment screw (on the opposite side of the video head). Adjust so that the dihedral meets the specification.
- (6) Perform the check procedures (1) and
 (2). Repeat the adjustment procedures
 (1) to (5) until the dihedral meets the specification.
- (7) Remove the dihedral adjustment screws, and check again.



7-15. CTL DELAY ADJUSTMENT

7-15-1. CTL Delay Adjustment (without sync)

Mode: Playback the alignment tape
Tool: Alignment tape, CR2-1PS
Dual trace oscilloscope

Preparation:

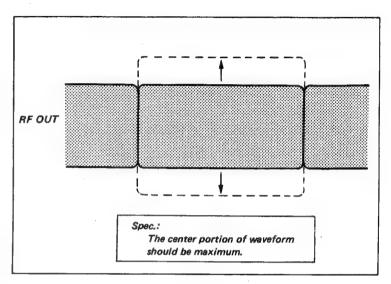
- Check that the video signal is not connected to the VIDEO IN terminal on the Connector Panel.
- (2) Connect the oscilloscope as follows; CH-1: TP301/MDM-3P Board EXT. TRIG: TP308/MDM-3P Board
- (3) Play back the alignment tape.
 Note: Be sure not to supply the video signals to the VIDEO IN connector.

Check procedure:

- (1) Turn the TRACKING volume to the clicked position.
- (2) Check that the center of the RF envelope waveform has the maximum amplitude.

Adjustment procedure:

(1) Adjust RV9 on the SV-94P Board so that the RF envelope waveform meets the specification.



7-15-2. CTL Delay Adjustment (with sync)

Mode: Playback the alignment tape
Tool: Alignment tape, CR2-1PS
Dual trace oscilloscope

Preparation:

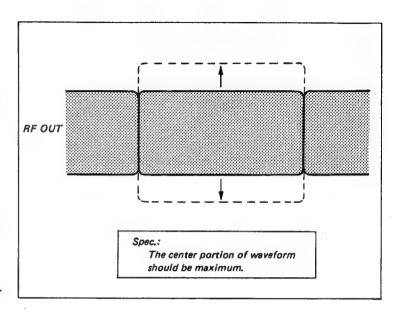
- Connect the video signal to the VIDEO IN terminal on the Connector Panel.
- (2) Connect the oscilloscope as follows; CH-1: TP301/MDM-3P Board EXT. TRIG: TP308/MDM-3P Board
- (3) Play back the alignment tape.

Check procedure:

- (1) Turn the TRACKING volume to the clicked position.
- (2) Check that the center of the RF envelope waveform has the maximum amplitude.

Adjustment procedure:

(1) Adjust RV14 on the SV-94P Board so that the RF envelope waveform meets the specification.



7-16. SWITCHING POSITION ADJUSTMENT 7-16-1. Video PB Head Switching Position Adjustment

Mode: Playback the alignment tape
Tool: Alignment tape, CR2-1BPS
Oscilloscope

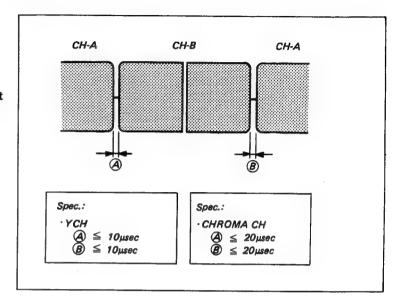
Preparation:

- (1) Remove the MDM-3P Board and extend it with an extension board.
- (2) Connect the oscilloscope as follows; . Y CH; CH-1: TP301/MDM-3P Board EXT. TRIG: TP308/MDM-3P Board
 - . CHROMA CH;
 CH-1: TP401/MDM-3P Board
 EXT. TRIG: TP408/MDM-3P Board
- (3) Play back the alignment tape.

Check procedure:

 Check that the CH-A and CH-B RF envelopes meet the specification at the switching pulse position.

- . Y CH;
- (1) Adjust RV2 on the SV-94P Board so that it meets the required specification.
- . CHROMA CH:
- (2) Adjust RV6 on the SV-94P Board so that it meets the required specification.



7-16-2. Video REC Head Switching Position Adjustment

Mode: Playback the alignment tape
Tool: Alignment tape, CR2-1BPS
PB amplifier tool
Dual trace oscilloscope

Preparation:

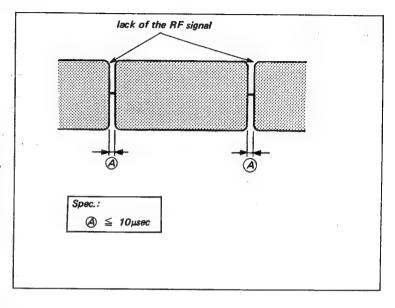
- (1) Disconnect the CN403 of the VRA-1 Board.
- (2) Connect the connector of the harness to the INPUT connector of the PB amplifier tool.
- (3) Disconnect the CN110 of the MB-157 Board.
- (4) Connect the OUTPUT connector of the PB amplifier tool to CN110 of the MB-157 Board.
- (5) Disconnect the connector of the brush on the Drum. Connect the connector of the harness to 3P connector of the PB amplifier tool.
- (6) Short between TP16 and GND on the SV-94P-Board with a shorting clip.
- (7) Connect the oscilloscope as follows; CH-1: TP301/MDM-3P Board EXT. TRIG: TP308/MDM-3P Board
- (8) Play back the alignment tape.

Check procedure:

- Turn the TRACKING volume to the clicked position.
- (2) Check that the output waveform of RF envelope meets the specification at the switching pulse position.

Adjustment procedure:

 Adjust RV3 on the SV-94P Board so that it meets the required specification.



7-16-3. Video CONFI Head Switching Position Adjustment

Mode: Playback the alignment tape
Tool: Alignment tape, CR2-1BPS
Dual trace oscilloscope

Preparation:

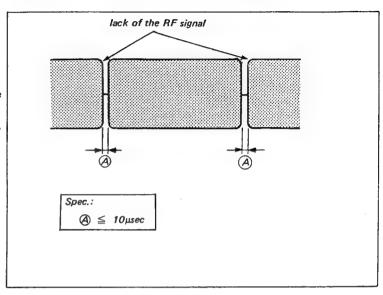
- Short between pin 8 of CN12 and GND on the SV-94P Board with a shorting clip.
- (2) Short between TP16 and GND on the SV-94P Board with a shorting clip.
- (3) Connect the oscilloscope as follows; CH-1:TP301/MDM-3P Board CH-2:TP308/MDM-3P Board EXT.TRIG:TP308/MDM-3P Board

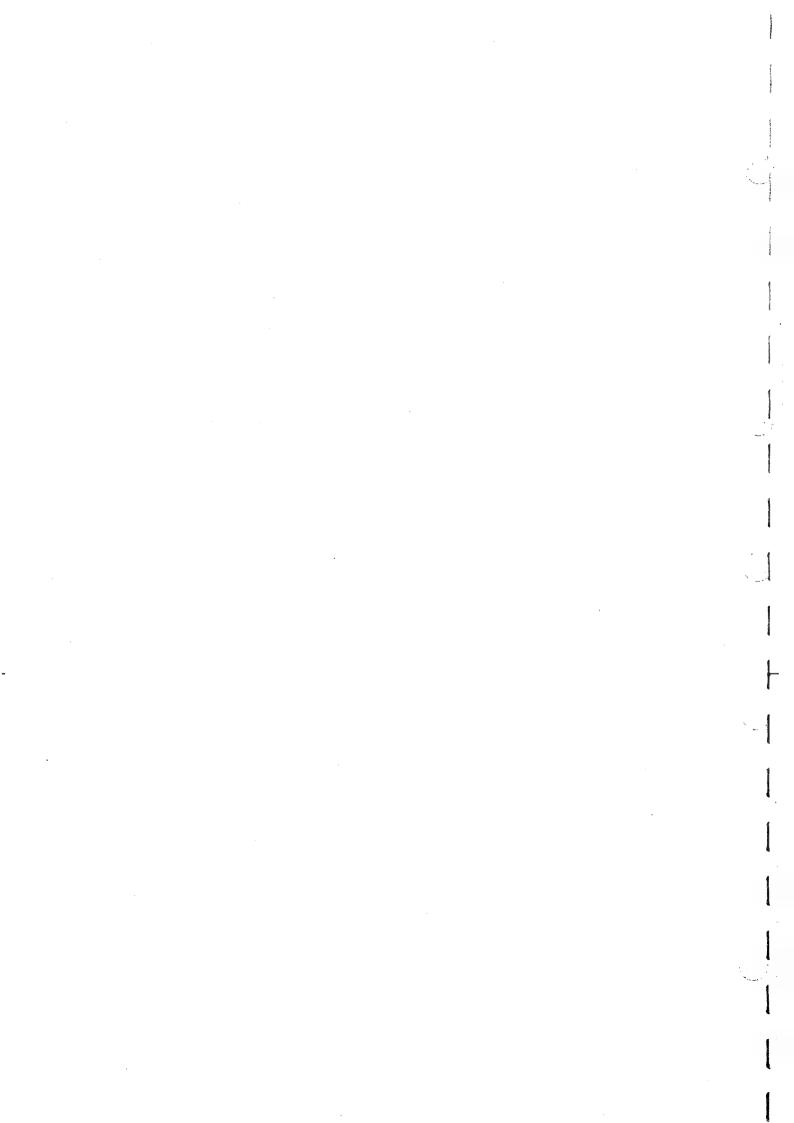
Check procedure:

- (1) Play back the alignment tape.
- (2) Check that the output waveform of RF envelope meets the specification at the switching pulse position.

Adjustment procedure:

 Adjust RV5 on the SV-94P Board so that it meets the required specification.





SECTION 8 POWER SUPPLY AND SYSTEM CONTROL ALIGNMENT

[Equipment Required]

- Oscilloscope
- · Blank tape (BCT-20K or the equivalent)
- · Variable voltage power supply
- DC voltmeter
- PAL signal generator (TEKTRONIX 1411 or equivalent)
- · Audio noise meter

8-1. POWER SUPPLY CHECK

Be sure to perform the following check when repairing or replacing a DC-DC converter.

8-1-1. DC-DC Converter Voltage Check

Machine conditions for adjustment	Specifications	Adjustments
• EE mode	TP1/MB-157(G-1)	
	+12.0±0.2 V	
• DC voltmeter	TP2/MB-157(D-2)	
	+9.2±0.2 V	
	TP3/MB-157(B-5)	·
	+5.1±0.2 V	
	TP4/MB-157(B-4)	
	-5.15±0.2 V	
	TP5/MB-157(G-1)	
w.	-12.05±0.2 V	

8-2. SYSTEM CONTROL ALIGNMENT

8-2-1. Battery Before/End Voltage Adjustment

Machine conditions for adjustment	Specifications	Adjustments
SAVE, PB/EE, PB select sw: SAVE (on the connector panel)	TP21/SY-110(C-1)	▼RV1/SY-110(J-1) Turn RV1 counter:lockwise
Turn RV1 on the SY-110 Board (J-1) fully clockwise direction. EXT DC IN: 10.540±0.005 V (from variable voltage power supply)	-10μsec	direction little by little, and adjust to the point that the negative pulse is generated.
• POWER SW: ON	A≒16 msec	

8-2-2. Battery Meter Calibration Adjustment

Machine conditions for adjustment	Specifications	Adjustments
VIDEO IN: color bar signal	AUDIO CH-2/TRACK/BATT meter	⊘ RV13/MT-34 (F-1)
• Supply 11.00±0.01 Vdc voltage to the battery terminal.	20 10 5 3 0 VIDEO	
• Insert a BCT-20 K cassette tape.	BATT	
• REC mode		
Put the unit vertically.	·	
• Meter select sw: BATT	Make a slight gap between the pointer and green belt. (within a pointer width)	

8-2-3. Alarm Tone Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
• Insert a BCT-20k cassette tape.	Comfirm that the TAPE END lamp	
Put the unit into the FF mode and set to tape end portion.	on the front panel lights.	
Maximize the Alarm Tone level with RV2 on the SY-110	HEADPHONES OUTPUT connector (terminated by 8Ω)	●RV2/SY-110 (C-1)
Board (C-1).	Lower the level by 6dB than recorded level. <reference></reference>	
Record this level of HEAD PHONES OUTPUT connector.	It is possible to adjust until the proper level as user s request.	

SERVO SYSTEM ALIGNMENT

[Equipment Required]

- · Square-wave oscillator
- DC voltmeter
- · Dual-trace oscilloscope
- · Frequency counter
- Monitor
- · Shorting clip
- PB amplifier jig (J-6331-120-A)
- Blank tape (BCT-20K)
- · Alignment tape CR2-1BPS (8-960-096-51)

Contents

VIDEO TRACK	AUDIO TRACK	TIME CODE TRACK	CTL TRACK
Y;6MHz signal C;5MHz signal	Blank	CTL	CTL

• Alignment tape CR5-2A PS (96-0098-44) Contents

TIME min. sec	VIDEO TRACK
0:00	75% Color Bars
3: 00 —	Multi Burst
6: 00	Bowtie & 10T
9: 55	
11:00	Pulse & Bar
13: 00	Quad Phase
	C-Monoscope Switching position is shifted.
15: 00	

• Alignment tape CR8-1A PS (96-0098-45) Contents

TIME min. sec	AUDIO TRACK
0: 00	1kHz, OVU
2: 55	Blank
	10kH, -10VU
4: 55 —— 5: 00 ——	Blank
	1kH, -20VU
5: 55 — 6: 00 —	Blank
0.00	40Hz
	7kHz 10kHz
7. 55	15kHz
7: 55 ——— 8: 00 ———	Blank
8.00	1kH, OVU AUDIO CH-1, CH-2 CTL
10:00	

[VIDEO IN]

 \cdot When performing the servo system alignment, supply standard video signal to the VIDEO IN.

9-1. FF/REW SPEED TENTATIVE ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
 Press the cassette-in switch without inserting a cassette tape and put the unit into the THREADING mode. 	TP6/SD-16P (E-1) 7.0±0.1 Vdc	⊘ RV23/SV-94P (K-2)
Place the unit prependecular to the floor.		
• REW mode		
• DC voltmeter		

9-2. FF REEL SEND CURRENT ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
 Press the cassette-in switch without inserting a cassette tape, and put the unit into the THREADING mode. 	Positive (+) side: TP9/SD-16P (G-2) Negative (-) side: TP10/SD-16P (D-2) 45±2 mVdc	⊘ RV31/SV-94P (L-3)
Place the unit prependecular to the floor.	45±2 mvdc	
Connect TP33 on the SV-94P Board (K-3) to GND with a shorting clip.		
 Supply 800 Hz, 5 Vp-o square- wave signal to TP34 on the SV-94P Board (K-3). 		
• FF mode		
• DC voltmeter		
 After the adjustment, remove the shorting clip. 		

9-3. REW REEL SEND CURRENT ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
 Press the cassette-in switch without inserting a cassette tape, and put the unit into the THREADING mode. 	Positive (+) side: TP8/SD-16P (G-2) Negative (-) side: TP5/SD-16P (D-2)	⊘ RV28/SV-94P (K-3)
Place the unit perpendicular to the floor.	68±2 mVdc	
Connect TP31 on the SV-94P Board (K-3) to GND with a shorting clip.		
 Supply 800 Hz, 5 Vp-o square- wave signal to TP32 on the SV-94P Board (K-3). 		
• REW mode		
• DC voltmeter		
After the adjustment, remove the shorting clip.	•	

9-4. imes 1/30 TOP REW ADJUSTMENT (AT THE TAKE-UP REEL)

Machine conditions for adjustment	Specifications	Adjustments
 Set the pre-recorded BCT-20K cassette tape to its beginning portion, and then insert it. 	Positive (+) side: TP8/SD-16P (G-2) Negative (-) side: TP5/SD-16P (D-2)	ØRV29/SV-94P (L-3)
 Put the unit into the REW- SEARCH mode. Three seconds later, connect TP50 on the 	66±2 mVdc	
SV-94P Board (F-2) to GND	<reference></reference>	
with a shorting clip. Then,	When REW-SEARCH mode:	
put the unit into the REW- SEARCH STILL mode.	66±5 mVdc	
• DC voltmeter		
After the adjustment, remove the shorting clip.		

9-5. $\times 1/30$ TOP FF ADJUSTMENT (AT THE TAKE-UP REEL)

Machine conditions for adjustment	Specifications	Adjustments
Set the pre-recorded BCT-20K cassette tape to its beginning, and then insert it.	Positive (+) side: TP8/SD-16P (G-2) Negative (-) side: TP5/SD-16P (D-2)	⊘ RV30/SV-94P (L-3)
 Put the unit into the FF- SEARCH mode. Three seconds later, connect TP50 on the 	264±2 mVdc	
SV-94P Board (F-2) to GND	<reference></reference>	
with a shorting clip. Then,	When FF-SEARCH mode:	
put the unit into the FF- SEARCH STILL mode.	264±10 mVdc	
• DC voltmeter		
 After the adjustment, remove the shorting clip. 		

9-6. $\times 1/30$ TOP FF ADJUSTMENT (AT THE SUPPLY REEL)

Machine conditions for adjustment	Specifications	Adjustments
 Set the pre-recorded BCT-20K cassette tape to its beginning portion, and insert it. 	Positive (+) side: TP9/SD-16P (G-2) Negative (-) side: TP10/SD-16P (F-1)	⊘ RV33/SV-94P (L-2)
• Put the unit into the FF- SEARCH mode. Three seconds later, connect TP50 on the	286±2 mVdc	
SV-94P Board (F-2) to GND	(Reference)	
with a shorting clip. Then,	When FF-SEARCH mode:	·
put the unit into the FF- SEARCH STILL mode.	110 <u>-</u> 1₀ mVdc	
• DC voltmeter		
· After the adjustment, remove		
the shorting clip.		

9-7. imes 1/30 TOP REW ADJUSTMENT (AT THE SUPPLY REEL)

Machine conditions for adjustment	Specifications	Adjustments
 Set the pre-recorded BCT-20K cassette tape to its beginning portion, and insert it. 	Positive (+) side: TP9/SD-16P (G-2) Negative (-) side: TP10/SD-16P (F-1)	⊘ RV34/SV-94P (L-2)
 Put the unit into the REW- SEARCH mode. Three seconds later, connect TP50 on the 	198±2 mVdc	
SV-94P Board (F-2) to GND	<reference></reference>	
with a shorting clip. Then,	When REW-SEARCH mode:	·
put the unit into the REW- SEARCH STILL mode.	285 ±18 mVdc	
• DC voltmeter		
After the adjustment, remove the shorting clip.		

9-8. SEARCH ×3 CURRENT ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
 Set the pre-recorded BCT-20K cassette tape to its beginning portion, and insert it. 	Positive (+) side: TP9/SD-16P (G-2) Negative (-) side: TP10/SD-16P (F-1)	● RV32/SV-94P (L-3)
• REW-SEARCH mode	440±2 mVdc	
• DC voltmeter	⟨Reference⟩ When inserting a pre-recorded BCT-20K cassette tape which is set to its end portion: 285 ½16 mVdc	

9-9. BACK TENSION ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
Set the pre-recorded BCT-20K cassette tape to its beginning portion, and insert it.	Positive (+) side: TP11/SD-16P (E-1) Negative (-) side: TP12/SD-16P (E-1)	● RV35/SV-94P (L·2)
• FF-SEARCH mode	1080±10 mVdc	
• DC voltmeter	<pre><reference> When inserting a pre-recorded BCT-20K cassette tape which is set to its end portion:</reference></pre>	

9-10. DRUM PG ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
Press the cassette-in switch without inserting a cassette tape, and put the unit into the THREADING mode. PLAY mode	CH-1: TP45/SV-94P (B-3) CH-2: TP5/SV-94P (B-3) TP45	⊘ RV1/SV-94P (B-2)
	A=25 mV \pm 25 mV (Reference) When connecting TP16 on the SV-94P Board (F-3) to GND with a shorting clip: $A=25 \text{ mV}\pm25 \text{ mV}$	

9-11. CAPSTAN FG-B ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
 Press the cassette in switch without inserting a cassette tape, and put the unit into the THREADING mode. PLAY mode 	CH-1: TP22/SV-94P (G-2) CH-2: (TRIG): TP401/SV-94P (G-2)	⊘ RV15/SV-94P (G·2)
·	A = B	

9-12. CAPSTAN FREE SPEED TENTATIVE ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
 Insert the alignment tape CR5-2A PS. 	TP20/SV-94P (A-1)	⊘RV21/SV-94P (B·l)
• PLAY mode	-B	
	Duty cycle $\left(\frac{B}{A}\right) = 30 \pm 2\%$	

9-13. STOP SERVO ADJUSTMENT

Step 1

Machine conditions for adjustment	Specifications	Adjustments
Connect TP24 on the SV-94P (J-1) Board to TP26 on the	TP28/SV-94P (J-1)	ØRV18/SV-94P (J-2)
SV-94P (K-1) with a shorting clip.	4 1	
Play back color bar signal on	^ -	
the alignment tape CR5-2A PS.	A=0	
After the adjustment, remove the shorting clip.		

Step 2

Machine conditions for adjustment	Specifications	Adjustments
Play back color bar signal on the alignment tape CR5-2A PS.	TP29/SV-94P (H-2)	
	A B C D	
	Check B≧ A/2	

Step 3

Machine conditions for adjustment	Specifications	Adjustments
• Connect TP25 on the SV-94P (J-1) Board to TP27 on the SV-94P Board (K-2) with a shorting clip.	TP41/SV-94P (H-1)	● RV19/SV-94P (J-2)
 Play back color bar signal on the alignment tape CR5-2A PS. 	A = 0.6±0.05 Vdc	
• PLAY•PAUSE mode	,	
After the adjustment, remove the shorting clip.		

9-14. TRACKING CENTER TENTATIVE ADJUSTMENT

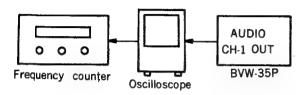
Machine conditions for adjustment	Specifications	Adjustments
Set the TRACKING control volume to the center clicked	CH-1: TP17/SV-94P (G-1) CH-2: TP21/SV-94P (E-2)	● RV14/SV-94P (F-2)
position. Insert the alignment tape		Adjust center of the jitter.
CR2-1B PS.	TP17	
• PLAY mode	TP21	
	TP17	
	TP21	
	A	
	$A = 6.7 \pm 0.1 \text{ ms}$	

9-15. 1/2VD PB CTL ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
 Connect TP16 on the SV-94P Board (F-3) to GND with a shorting clip. Insert the alignment tape CR2-1B PS. 	CH-1: TP44/SV-94P (J-1) CH-2: TP21/SV-94P (E-2) TP44	⊘ RV21/SV-94P (B-1)
 PLAY mode After the adjustment, remove the shorting clip. 	TP21	
	$A=0\pm100\mu\mathrm{sec}$	

9-16. TAPE SPEED ADJUSTMENT

[Connection]



Machine conditions for adjustment	Specifications	Adjustments
• Connect as follows with shorting clips:	AUDIO OUT CH-1 connector	◆ RV20/SV-94P (B-2)
TP21/SY-110 (C-1) \longleftrightarrow GND TP30/SV-94P (B-1) \longleftrightarrow GND	tape speed=1000±1 Hz	 Adjust output level according to the correction value
• Insert the alignment tape CR8-1A PS.		
Play back from 0:00 to 2: 55 on the alignment tape CR8-1A PS.		
• After the adjustment, remove the shorting clips.		

9-17. FF/REW SPEED ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
Insert the Alignment tape CR5-2A PS.	TP17/SV-94P (G-1)	●RV23/SV-94P (K-2)
REW mode (from 15: 00 to 5: 00 on the alignment tape CR5-2A PS).	2.66 msec±0.05 msec	

9-18. DRUM LOCK PHASE/P2 PHASE ADJUSTMENT

Step 1

Machine conditions for adjustment	Specifications	Adjustments
Connect TP7/SV-94P (C-4) to GND with a shorting clip.	CH-1: TP42/SV-94P (B-3) CH-2: TP48/SV-94P (A-1)	⊘ RV7/SV-94P (E-2)
VIDEO IN: color bar signal Insert a BCT-20K cassette tape. REC mode After the adjustment, remove the shorting clip.	TP48	
	A=143 \pm 9.5 μ sec (2.25 \pm 0.15H)	

Step 2

Machine conditions for adjustment	Specifications	Adjustments
VIDEO IN: color bar signal Insert a BCT-20K cassette tape.	CH-1: TP42/SV-94P (B-3) CH-2: TP48/SV-94P (A-1)	⊘ RV4/SV-94P (B-3)
• REC mode	TP42	
	TP48	
	A=value in step $1\pm6.3\mu$ sec (0.1H)	

9-19. DRUM AFC ADJUSTMENT

Step 1

Machine conditions for adjustment	Specifications	Adjustments
VIDEO IN: color bar signal	TP12/SV-94P (E-1)	
	2.5±0.5 Vdc	
• TBC SW: OFF		
	TP11/SV-94P (E-1)	
Connect VIDEO OUT 1 to the monitor.	voltage value in TP12±0.5 Vdc	
Play back color bar signal on		
the alignment tape CR5-2A		,
PS.		

Step 2

Machine conditions for adjustment	Specifications	Adjustments
Set RV37 on the SV-94P Board (E-2) to the mechanical center position. Play back color bar signal on the alignment tape CR5-2A PS. STILL mode	TP10/SV-94P (D-1) Time difference A between PLAY and STILL modes ≤ 0.1 μsec * The monitor should be locked.	RV10/SV-94P (F-1) • Adjust center of the jitter.

Step 3

Machine conditions for adjustment	Specifications	Adjustments
Play back color bar signal on the alignment tape CR5-2A	CN11 (6 pin)/SV-94P (E-1)	● RV37/SV-94P (E-2)
PS.	1.85±0.02 Vdc	
REW-SEARCH mode		

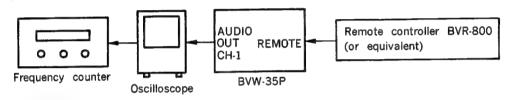


Step 4 Check

Machine conditions for adjustment	Specifications	Adjustments
 Play back color bar signal on the alignment tape CR5-2A PS. 	TP13/SV-94P (E-1) Voltage difference between PLAY mode and STILL mode ≤ 0.3 Vdc	
• PLAY mode and STILL mode		

9-20. SEARCH X1/30 ADJUSTMENT

[Connection]



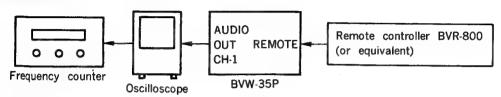
[Preparation]

- CH-1 AUDIO IN: 3000±1 Hz -60 dBs
- Insert a BCT-20K cassette tape, and record above signal.
 - *Recording near the middle of the tape is also possible. (approximately five minutes)

Machine conditions for adjustment	Specifications	Adjustments
Put the unit into the remote controller's FWD SEARCH ×1/30 mode near the middle of the tape.	AUDIO OUT CH-1 connector	⊘ RV16/SV-94P (F-2)
Set the (3 kHz) recorded BCT-20K cassette tape to near its middle portion.	100.0±2 Hz	
Remote controller BVR-800 (or the equivalent)		
Frequency counter		

9-21. SEARCH X1 ADJUSTMENT

[Connection]



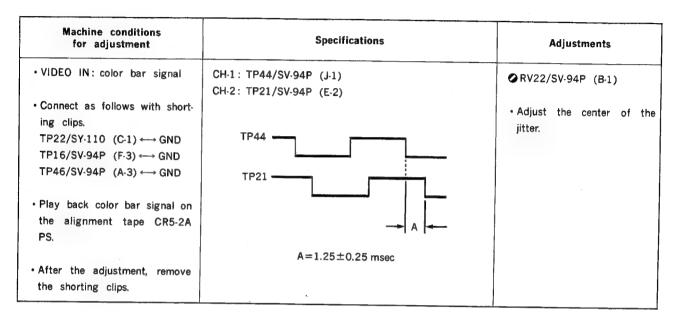
[Preparation]

- CH-1 AUDIO IN: 3000±1 kHz -60 dBs
- Insert a BCT-20K cassette tape, and then record above signal.
 *Recording near the middle of the tape is also possible (approximately five minutes).

Machine conditions for adjustment	Specifications	Adjustments
• Put the unit into the remote controller's FWD-SEARCH ×1 mode near the middle of the	AUDIO OUT CH-1 connector	⊘RV17/SV-94P (F-2)
tape.	2950±10 Hz	
 Set the (3 kHz) recorded BCT-20K cassette tape to its middle. 	$\langle \text{Reference} \rangle$ When FWD-SEARCH $ imes 1/30$ mode. $100 \pm 5 \text{ Hz}$	
• Remote controller (BVR-800 or the equivalent)	When FWD-SEARCH ×5 mode. 8700±500 Hz	
Frequency counter		

9-22. QUICK START ADJUSTMENT

Step 1



Step 2 Check

Machine conditions for adjustment	Specifications	Adjustments
VIDEO IN: color bar signal	CH-1: TP44/SV-94P (J-1) CH-2: TP21/SV-94P (E-2)	
Insert a BCT-20K cassette tape.	TP44 ———————————————————————————————————	
• REC mode		
Press the PAUSE button five times each two seconds.	TP21	
Play back the recorded portion.	B =	
	A≤0.5 msec	
	B≦1.0 msec	
· .	*When specification is not satisfied, perform readjust- ment within the spec. in the step1.	

CN741/SV-94P (+9V, GND) (Y REC HEAD) PB amplifier jig CN10/MB-157 (Y PB HEAD)

9-23. RECORDING PICTURE SPLIT ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
Connect a monitor to the VIDEO OUT connector.	monitor picture splitting point	
 Connect the PB amplifier jig. Connect TP16 on the SV-94P Board (F-3) to GND with a shorting clip. S1/ENC-11P (C-1): ON Play back C-monoscope signal on the alignment tape CR5-2A PS. 	picture split A≤1µsec	
• Put the monitor into the H-DELAY mode.	If the specification is not satisfied, perform adjustment as follows: Step 1 Check the picture splitting point.	◆RV11/SV-94P (E-2) ◆RV12/SV-94P (D-1)
 After the adjustment, set S1 on the ENC-11P Board to OFF again, and then remove the shorting clip. 	Step 2 Set RV12 to the mechanical center position. Step 3 Adjust the picture splitting point to the former position with RV11. Step 4 Minimize the picture split A with RV12.	

9-24. V JITTER ADJUSTMENT IN THE STILL MODE

Machine conditions for adjustment	Specifications	Adjustments
Connect a monitor to the VIDEO OUT connector.	monitor	⊘ RV36/SV-94P (C-3)
 Play back C-monoscope signal on the alignment tape CR5-2A PS. PLAY · PAUSE mode 	0	
	Minimize the V jitter	

•

SECTION 10 AUDIO SYSTEM ALIGNMENT

[Required equipment]

- · Audio oscillator
- · Audio attenuator
- · AC voltmeter/Audio noise meter
- · Spectrum analyzer
- · Dual-trace oscilloscope
- Alignment Tape CR8-1A PS (96-0098-45)

Contents

TIME min. sec	AUDIO TRACK
0: 00 2: 55 ———	1kHz, OVU
1	Blank
3: 00 ——	
4. 55	10kH, -10VU
4: 55 —	Blank
5: 00	Did.iii.
	1kH, -20VU
5: 55	Blank
6: 00	Dialik
	40Hz
	7kHz
	10kHz
	15kHz
7: 55	138112
	Blank
8: 00 —	
	1kH, OVU
1	AUDIO CH-1, CH-2
	CTL
10:00	
10.00	

• Alignment tape CR5-1B PS (8-960-096-91) Contents

TIME min. sec		1	
0: 00 RF Sweep 2: 00 60% H Sweep (CTDM) 5: 00 Pulse & Bar (CTDM) No-Signal 8: 00 Multi Sweep 11: 00 Pulse & Bar 14: 00 100% Color Bars 16: 30 17: 00 Bowtie & 10T 19: 00 Line 17A Signal 22: 00 Quad Phase 24: 00 Quad Phase 24: 00 Flat Field 26: 00 100% Color Bar with Dropout Composite H Sweep		VIDEO TRACK	AFM
2: 00	min. sec		
60% H Sweep (CTDM) 5: 00 Pulse & Bar (CTDM) No-Signal 8: 00 Multi Sweep 11: 00 Pulse & Bar 14: 00 100% Color Bars 25 kHz DEVIATION 75 kHz DEVIATION Bowtie & 10T 19: 00 Line 17A Signal 22: 00 Quad Phase 24: 00 Flat Field 26: 00 100% Color Bar with Dropout Composite H Sweep	0:00	RF Sweep	
Pulse & Bar (CTDM) No-Signal	2: 00		
Pulse & Bar (CTDM) No-Signal		60% H Sweep (CTDM)	
8: 00 Multi Sweep 11: 00 Pulse & Bar 14: 00 100% Color Bars 25 kHz DEVIATION 75 kHz DEVIATION Bowtie & 10T 19: 00 Line 17A Signal 22: 00 Quad Phase 24: 00 Flat Field 26: 00 100% Color Bar with Dropout Composite H Sweep	5: 00 ——		
Multi Sweep 11: 00		Pulse & Bar (CTDM)	No-Signal
11: 00 — Pulse & Bar 14: 00 — 100% Color Bars	8: 00		
Pulse & Bar 14: 00 100% Color Bars 25 kHz DEVIATION 75 kHz DEVIATION Bowtie & 10T 19: 00 Line 17A Signal 22: 00 Quad Phase 24: 00 Flat Field 26: 00 100% Color Bar with Dropout Composite H Sweep		Multi Sweep	
16: 30	11: 00	Pulse & Bar	
16: 30	14:00		
17: 00		100% Color Bars	
Bowtie & 10T			75 kHz DEVIATION
19: 00 Line 17A Signal 22: 00 Quad Phase 24: 00 Flat Field 26: 00 100% Color Bar with Dropout Composite H Sweep	17: 00		70 KILE DEVIATION
22: 00 Quad Phase 24: 00 Flat Field 26: 00 100% Color Bar with Dropout 28: 00 Composite H Sweep	19: 00	Bowtie & 10T	
Quad Phase 24: 00 Flat Field 26: 00 100% Color Bar with Dropout Composite H Sweep		Line 17A Signal	
Flat Field 26: 00 100% Color Bar with Dropout Composite H Sweep		Quad Phase	
28: 00 Color Bar with Dropout Composite H Sweep		Flat Field	No-Signal
Composite H Sweep			
00,00 1101 1100.	30:00	Composite H Sweep with VISC	

- Alignment Tape CR8-1B PS (8-960-096-86)

Contents

TIME min. sec	AUDIO TRACK	VIDEO TRACK	CTL TRACK
00:00	1 kHz OVU	Black Burst	CTL
02: 30	Blank (only Bias)	Black Burst	CTL
03: 00	15 kHz OVU	Black Burst	CTL
05: 00	1 kHz -20VU	Black Burst	CTL
06: 00	40 Hz — 20VU 7 kHz — 20VU 10 kHz — 20VU 15 kHz — 20VU	Black Burst	CTL
08: 00	1 kHz OVU		1 kHz Sine Wave

[NOTE]

When replacing the VRs described below, be sure to turn the VRs fully counterclockwise direction from viewing the component side.

RV1 on the HP-36 Board RV1 on the VR-63 Board

[Switch Setting]

Front panel

CH-1 AUDIO REC level switch

: MANUAL

CH-2 AUDIO REC level switch

: MANUAL

METER select switch

: AUDIO

· Connector Panel

CAMERA/LINE select switch

: LINE (CH-1 to CH-4)

AUDIO IN level select switch

: +4dB (CH-1 to CH-4)

AFM INPUT switch

: CH-3/CH-4

EE select switch

: NORMAL

CH-4 OUT switch

: CH-4

CH-1 +48V switch

: OFF

AUDIO NR switch

MONITOR select swich

: OFF : OFF (CH-1 to CH-4)

CONFI switch

: Y AUDIO

VIDEO IN select switch

: LINE

TBC switch

: OFF

DUD 19-16

Urr

DUB switch

: CH-2

These switches and volume controls should not be touched unless otherwise specified.

[Blank Tape]

The "Blank Tape" described in the adjustment item indicates the cassette tape on which no video and audio signals are recorded.

When performing the audio system alignment, extend the AU-93P Board with an extension board (EX-150 Board).

When performing Longitudinal Audio system alignment, set S1 on the AU-93P Board (E-3) to the LV102 side. After alignment, set S1 to the former position. Check that the S2 on the AU-93P Board (C-1) is set to the CH-1 side.

10-1. EE LEVEL ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
• EE mode	CH-1: TP102/AU-93P (F-4) CH-2: TP202/AU-93P (F-4)	○CH-1/CH-2: CH-1, CH-2 REC VRs on the
• AUDIO IN CH-1/CH-2:1 kHz, +4 dBs AUDIO IN CH-3/CH-4: 400Hz, +4 dBs	−10±0.1 dBs	front panel
	CH-3; pin 1 of the NR-19 Board/AU-93P (C-2) CH-4; pin 10 of the NR-19 Board/AU-93P (C-2) $-19.5 \pm 0.1 \text{ dBs}$	CH-3/CH-4: CH-3, CH-4 REC VRs on the front panel
	Note: Be careful not to touch the REC VRs which have been adjusted.	

10-2. LIMITER OPERATION LEVEL ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
• Set the CH-1/CH-2 AUDIO IN level select switch to -60 dB.	AUDIO OUT CH-1 connector (at 600-ohm load) AUDIO OUT CH-2 connector (at 600-ohm load)	◆ CH-1: RV101/AU-93P (D-3) ◆ CH-2: RV201/AU-93P (C-3)
• EE mode		
• AUDIO IN CH-1/CH-2: 1kHz, -30 dBs	+15±0.2 dBm	
After the adjustment, set the CH-1/CH-2 AUDIO IN level select switch to +4 dB.		

10-3. LEVEL METER CALIBRATION ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
• EE mode	Audio level meter (CH-1 to CH-4)	OCH-1: RV5/MT-34 (A-1)
	10 5 3 0	OCH-2: RV6/MT-34 (C-1)
· AUDIO IN (CH-1 to CH-4):	20	○ CH-3: RV7/MT-34 (D-1)
1 kHz, +4 dBs	- +	⊘ CH-4: RV8/MT-34 (E-1)
• METER select switch: AUDIO	//	
	VU	
	The pointer reading should be zero.	
Put the unit upright and place		
the meter at horizontal level.	<reference></reference>	
	When putting the unit upright and placing the meter at the vertical level.	

10-4. PB FREQUENCY RESPONSE ADJUSTMENT

Step 1. PB Frequency Response Check

			Adjustments
Frequency 1 kHz 7 kHz 10 kHz 15 kHz Note: Each	CH-2 connector (at Le CH-1 Reference Reference±0.3 dB Reference±0.5 dB Reference±0.7 dB audio level should bhe correction value.	vel CH-2 Reference Reference±0.3 dB Reference±0.5 dB Reference±1.2 dB e corrected according	 7 kHz Adjustment ◆ CH-1: RV302/AU-93P (D-2) ◆ CH-2: RV352/AU-93P (D-2) 10 kHz and 15 kHz Adjustment ◆ CH-1: RV304/AU-93P (D-1) ◆ CH-2: RV354/AU-93P (D-1)
	Frequency 1 kHz 7 kHz 10 kHz 15 kHz Note: Each	AUDIO OUT CH-2 connector (at Frequency	CH-1 CH-2 1 kHz Reference Reference 7 kHz Reference±0.3 dB Reference±0.3 dB 10 kHz Reference±0.5 dB Reference±0.5 dB 15 kHz Reference±0.7 dB Reference±0.2 dB Note: Each audio level should be corrected according

Step 2. In case the high-frequency level is lower than the specified value.

Machine conditions for adjustment	Specifications	Adjustments
 Play back 1 kHz, 7 kHz, 10 kHz and 15 kHz signals on the aligniment tape CR8-1A 	Solder-bridge slots SL301 and SL351 and perform Step 1.	
PS.	 When the specification is not satisfied: Solder-bridge slots SL302 and SL352 and perform Step 1. 	
	 When the specification is not satisfied: Solder-bridge slots SL303 and SL353 and perform Step 1. 	

10-5. PB LEVEL ADJUSTMENT

Step 1.

Machine conditions for adjustment	Specifications	Adjustments
• Play back 1 kHz, 0 VU signals	CH-1: TP102/AU-93P (F-4)	◆CH-1: RV303/AU-93P (D-3)
on the alignment tape CR8-1B PS	CH-2: TP202/AU-93P (F-4)	◆CH-2: RV353/AU-93₽ (C-3)
	−10±0.2 dBs	

Step 2.

Machine conditions for adjustment	Specifications	Adjustments
Play back 1 kHz, 0 VU signals on the alignment tape CR8-1B PS.	AUDIO OUT CH-1 connector (at 600-ohm load) AUDIO OUT CH-2 connector (at 600-ohm load)	◆ CH-1: CH-1 PB VR ◆ CH-2: CH-2 PB VR
	+4±0.3 dBm	(on the front panel)
	Note: Be careful not to touch the PB VRs which have been adjusted.	

10-6. FULL ERASE CURRENT ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
• Insert a BCT-20M cassette tape.	TP851/AU-93P (G-1)	⊘ RV851/AU-93P (H-2)
• REC mode	308 ^{+ 0} / ₋₅ mVrms	

10-7. DUB ERASE CURRENT ADJUSTMENT

*After the DUB Erase Current Adjustment, the CH-1 and CH-2 DUB phases should coincide with the signal phase at TP852.

If not, finely adjust them with LV901 and LV951. (Be sure to change the phase in the channel with higher level).

10-7-1. CH-1 DUB Erase Current Adjustment

Machine conditions for adjustment	Specifications	Adjustments
• AUDIO IN CH-1/CH-2: No signal	Step1. TP852/AU-93P (F-1) 130±1 kHz	⊘ RV801/AU-93P (G-4)
Insert a recorded BCT-20M cassette tape on which signals have been recorded. CH-1 DUB mode	Step2. TP902/AU-93P (F-1) (TRIG): TP852/AU-93P (H-4)	⊘ LV901/AU-93P (G-1) ⊘ CP902/AU-93P (G-2)
*Ch-1 DDB mode	Maximize the level. *Adjustment should be performed within the	
	Step3. TP902/AU-93P (F-1)	⊘ RV903/AU-93P (F-2)
	440 +0 mVrms	

10-7-2. CH-2 DUB Erase Current Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· AUDIO IN CH-1/CH-2: No	Step1.	
signal	TP952/AU-93P (G-1)	⊘ LV951/AU-93P (G-1)
	(TRIG): TP852/AU-93P (H-4)	● CP952/AU-93P (G-2)
 Insert a recorded BCT-20M cassette tape on which signals have been recorded. 	Maximize the level.	
	*Adjustment should be performed within the	
• CH-2 DUB mode	range where the signal phase is locked.	
	Step2.	ØRV953/AU-93P (G-2)
	TP952/AU-93P (G-1)	,
	440 ⁺⁰ ₋₉₀ mVrms	

10-8. BIAS CURRENT PRELIMINARY ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
AUDIO IN (CH-1 to CH-4): No signals	CH-1 : TP303/AU-93P (D-1) (GND) : TP304/AU-93P (D-1)	
• Insert a BCT-20M cassette tape.	CH-2 : TP353/AU-93P (D-1) (GND) : TP354/AU-93P (C-1)	
• REC mode	(TRIG): TP852/AU-93P (H-4) * Check that signal waveform at TP is locked to TRIG, and proceed to the next adjustment.	
	Step1.	◆ CH-1: CP901/AU-93P (G-3) ◆ CH-2: CP951/AU-93P (G-3)
	A = MAX	
	Step2. $A = 15 \pm 2 \text{ mVrms}$	◆ CH-1: RV901/AU-93P (G-3) ◆ CH-2: RV951/AU-93P (H-3)

10-9. REC BIAS TRAP ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments	
• Insert a BCT-20M cassette	CH-1 : TP302/AU-93P (E-2)	OCH-1: LV301/AU-93₽ (E-2)	
tape.	CH-2 : TP352/AU-93P (F-1)	OCH-2: LV351/AU-93₽ (E-1)	
	(TRIG): TP852/AU-93P (H-4)		
• REC mode			
	Minimize the bias leak. (≤10 dBs)		
· AUDIO IN CH-1/CH-2: No			
signals	* Check that the leak bias is locked to TRIG.		

10-10. BIAS CURRENT ADJUSTMENT (METAL)

Step 1. CH-1 Adjustment

Machine conditions for adjustment	Specifications	Adjustments
CH-1 AUDIO IN: 1kHz, +4dBs CH-4 OUT SW: MON CH-1 MONITOR SELECT SW: ON Insert a BCT-20M cassette tape. REC mode	AUDIO OUT CH-4 connector (at 600-ohm load) A≒(maximum level)−2dB	♥ RV901/AU-93P(G-3) Turn RV901 gradually clockwise direction.
• Turn RV901 on the AU-93P Board(G-3) fully counter clockwise direction temporarily.	CH-1: TP303/AU-93P(D-1) (GND): TP304/AU-93P(D-1)	⊘ RV901/AU-93P(G-3)
• After the adjustment CH-4 OUT SW: CH-4 CH-1 MONITOR SELECT SW: OFF	① B≥18 mVrms C=15±0.2 mVrms ② B≤18 mVrms C=B-3±0.2 mVrms *The signal waveform at TP should be locked to the TRIG.	
	TRIG: TP852/AU-93P(H-4)	

Step 2. CH-2 Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· CH-2 AUDIO IN: 1kHz, +4dBs	AUDIO OUT CH-4 connector (at 600-ohm load)	♥ RV951/AU-93P(H-3)
CH-4 OUT SW: MON CH-2 MONITOR SELECT SW: ON Insert a BCT-20M cassette tape. REC mode	A = (maximum level) - 2dB	
•Turn RV951 on the AU-93P Board (H-3) fully counter-clockwise direction temporarily.	CH-1: TP353/AU-93P(D-1) (GND): TP354/AU-93P(C-1) C B D B≥18 mVrms C=15±0.2 mVrms	⊘ RV951/AU-93P(H-3)
	② B≤18 mVrms C=B-3±0.2 mVrms	
After the adjustment, CH-4 OUT SW: CH-4 CH-2 MONITOR SELECT	*The signal waveform at TP should be locked to the TRIG.	·
SW: OFF	TRIG: TP852/AU-93P(H-4)	

10-11. BIAS CURRENT ADJUSTMENT (OXIDE)

Machine conditions for adjustment	Specifications	Adjustments	
• AUDIO IN CH-1/CH-2: No	CH-1 : TP303/AU-93P (D-1)	◆ CH-1: RV902/AU-93P (G-3)	
signals	(GND): TP304/AU-93P (D-1)	◆ CH-2: RV952/AU-93P (G-3)	
• Insert a BCT-20K cassette	CH-2 : TP353/AU-93P (D-1)		
tape.	(GND) : TP354/AU-93P (C-1)		
· REC mode	(TRIG) : TP852/AU-93P (H-4)		
	11±0.2 mVrms		
	* When the adjustment value is less than 11 mVrms. Value \pm 0.2 mVrms		
	Note: The signal phase should be locked.		

10-12. DUB BIAS TRAP ADJUSTMENT

Step 1. CH-1 Adjustment

Machine conditions for adjustment	Specifications	Adjustments
• AUDIO IN: No signals	CH-1: TP305/AU-93P (D-3)	◆ CH-1: LV302/AU-93P (D-2)
 Insert a BCT-20M cassette tape on which signals have been recorded. 	Minimize the level.	
• CH-2 DUB mode		

Step 2. CH-2 Adjustment

Machine conditions for adjustment	Specifications	Adjustments
• AUDIO IN: No signals	CH-2: TP355/AU-93P (C-3)	◆CH-2: LV352/AU-93P (C-2)
 Insert a BCT-20M cassette tape on which signals have been recorded. 	Minimize the level.	
·CH-1 DUB mode		

10-13. OVERALL FREQUENCY RESPONSE ADJUSTMENT (OXIDE)

Machine conditions for adjustment	Specifications			Adjustments
• AUDIO IN CH-1/CH-2: 40, 1 k, 10 k, 15 k (Hz), -16dBs		connector (at 600-ohm connector (at 600-ohm	•	• 10 kHz and 15kHz signal portion • CH-1: RV1/AR-12P (F-2)
• Insert a BCT-20K cassette	Frequency	Specification		[A2]
ta pe.	40Hz	Reference±3dB		◆CH-2: RV1/AR-12P (F-2) [A3]
	1kHz	Reference		[V2]
• Play back the self-recorded	10kHz	Reference±0.5dB		• 15 kHz signal portion only
ta pe,	15kHz	Reference±0.5dB		○CH-1: LV101/AU-93P (E-3)
		- 		ØCH-2: LV201/AU-93P (F-3)

10-14. OVERALL PHASE ADJUSTMENT (OXIDE)

Machine conditions for adjustment	Specifications	Adjustments
Oscilloscope connection (in X-Y)	AUDIO OUT CH-1 connector (at 600-ohm load)	●RV2/AR-12P (F-2) [A2]
mode)	AUDIO OUT CH-2 connector (at 600-ohm load)	(F-2) [A3]
CH-1: CH-1 AUDIO OUT . conncetor		* Either A2 or A3.
CH-2: CH-2 AUDIO OUT conncetor		
• AUDIO IN CH-1/CH-2: 15 kHz, +4 dBs	(6 cm) Within 5*(0.5 cm)	
• Insert a BCT-20K cassette tape.		
	(6 cm)	
• Play back the self-recorded	(0 5.1.)	
tape.		

10-15. OVERALL LEVEL ADJUSTMENT (OXIDE)

Machine conditions for adjustment	Specifications	Adjustments
· AUDIO IN CH-1/CH-2: 1 kHz,	CH-1: TP102/AU-93P (F-4)	◆ CH-1: RV102/AU-93P (F-2)
+4dBs	CH-2: TP202/AU-93P (F-4)	◆CH-2: RV202/AU-93P (F-1)
• Insert a BCT-20K cassette		
tape.	-10±0.1 dBs	
Play back the self-recorded		
tape.		

10-16. CONFI OUTPUT LEVEL ADJUSTMENT

Step 1. CH-1 Adjustment

Machine conditions for adjustment	Specifications	Adjustments
• AUDIO IN CH-1:1kHz,+4dBs	AUDIO OUT CH-4 connector (at 600-ohm load)	ØRV1/CO-8
Insert a BCT-20K cassette tape.	+3±1 dBm	
• REC mode		
• CH-1 MONITOR select SW: ON		
• CH-4 OUT SW: MON		

Step 2. CH-2 Adjustment

Specifications	Adjustments
AUDIO OUT CH-4 connector (at 600-ohm load)	⊘ RV2/C0-8
+3±1 dBm	
	AUDIO OUT CH-4 connector (at 600-ohm load) +3±1 dBm

10-17. CONFI TC CANCEL ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
• AUDIO IN CH-1/CH-2: No signals	AUDIO OUT CH-4 connector (at 600-ohm load)	⊘ RV702/AU-93P (C-1)
• Insert a BCT-20K cassette tape.		
• REC mode		
• CH-1, 2 MONITOR select SW:	Minimize the level.	
· CH-4 OUT SW: MON		
• After the adjustment, return the CH-1/CH-2 MONITOR select switch to OFF and the CH-4 OUT switch to CH-4.	•	

10-18. INSERT CROSSTALK CANCEL ADJUSTMENT

Step 1. CH-1 Adjustment

Machine conditions for adjustment	Specifications	Adjustments
• AUDIO IN CH-1: No signals AUDIO IN CH-2: 5 kHz, +4 dBs	AUDIO OUT CH-1 connector (at 600-ohm load) Minimize the crosstalk (5 kHz) in CH-2.	○ RV1/DC-33○ RV2/DC-33Alternately adjust.
 Insert a BCT-20K cassette tape on which only CTL signals have been recorded. 	Note: The AUDIO OUT level difference between CH-1 and CH-2 should be 20dB or more.	
· CH-2 DUB mode		

Step 2. CH-2 Adjustment

Machine conditions for adjustment	Specifications	Adjustments
• AUDIO IN CH-1: 5 kHz, +4dBs AUDIO IN CH-2: No signals	AUDIO OUT CH-2 connector (at 600-ohm load) Minimize the crosstalk (5 kHz) in CH-1.	○ RV3/DC-33○ RV4/DC-33Alternately adjust.
 Insert a BCT-20K cassette tape on which only CTL signals have been recorded. CH-1 DUB mode 	Note: The AUDIO OUT level difference between CH-1 and CH-2 should be 20 dB or more.	

10-19. OVERALL FREQUENCY RESPONSE ADJUSTMENT (METAL)

Machine conditions for adjustment	:	Specifications		Adjustments
• S1/AU-93P: OFF • AUDIO IN CH-1/CH-2: 40, 1 k, 10 k, 15 k (Hz), -16 dBs		onnector (at 600-ohm onnector (at 600-ohm	•	• 10 kHz and 15kHz signal portion • CH-1: RV3/AR-12P (F-2) [A2] • CH-2: RV3/AR-12P (F-2) [A3]
 Insert a BCT-20M cassette tape. 	Frequency	Specification		[//0]
	40Hz	Reference ± 3dB		
· Play back the self-recorded	1kHz	Reference		• 15 kHz signal portion only
tape.	10kHz	Reference±0.5dB		OCH-1: LV102/AU-93P (E-3)
	15kHz	Reference±0.5dB		◆CH-2: LV202/AU-93P (F-3)

10-20. OVERALL PHASE ADJUSTMENT (METAL)

Machine conditions for adjustment	Specifications	Adjustments
Oscilloscope connection (in X-Y mode)	AUDIO OUT CH-1 connector (at 600-ohm load) AUDIO OUT CH-2 connector (at 600-ohm load)	⊘ RV4/AR-12P [A2] [A3]
CH-1: AUDIO OUT CH-1 con- nector		* Either A2 or A3.
CH-2: AUDIO OUT CH-2 con- nector		
• AUDIO IN CH-1/CH-2: 15 kHz, +4 dBs	(6 cm) Within 5°(0.5 cm)	
 Insert a BCT-20M cassette tape. 		
• Play back the self-recorded tape.	(6 cm)	

10-21. OVERALL LEVEL ADJUSTMENT (METAL)

Machine conditions for adjustment	Specifications	Adjustments
· AUDIO IN CH-1/CH-2: 1kHz,	CH-1: TP102/AU-93P (F-4)	ØCH-1: RV103/AU-93P (F-2)
+4 dBs	CH-2: TP202/AU-93P (F-4)	◆CH-2: RV203/AU-93P (F-1)
	-10±0.3 dBs	
• Insert a BCT-20M cassette	<reference></reference>	
ta pe.	AUDIO OUT CH-1 connector (at 600-ohm load)	
	AUDIO OUT CH-2 connector (at 600-ohm load)	
• Play back the self-recorded		
tape.	+4±1 dBm	

10-22. AFM LIMITER LEVEL ADJUSTMENT

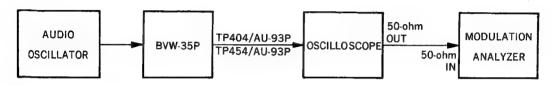
Machine conditions for adjustment	Specifications	Adjustments
• AUDIO IN CH-3/CH-4: 400Hz	CH-3: TP405/AU-93P (B-2)	◆CH-3: RV405/AU-93P (B-2)
	CH-4: TP455/AU-93P (B-2)	◆CH-4: RV455/AU-93P (B-3)
• LEVEL SELECT SW: -20 dB		
• Set pins 1 and 10 of the	positive side	
NR-19 Board to -19.5 dBs		
with the oscillator. Then, raise	\hat{A} \hat{A} \hat{A}	
the level by 20 dB.	/ \ /	
• EE mode	/	
LE MOOO	negative	
• Set the CH-3/CH-4 AUDIO IN	side	
level select SW to +4 dB	Adjust at point where the waveform distortion appears.	
again.		
	* When the waveform distortion of the positive side	
	appears at first, short SL502 on the AU-93P Board	
	(B-3).	

10-23. AFM CARRIER FREQUENCY ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
• AUDIO IN CH-3/CH-4: No signal	Step1 TP404/AU-93P (A-3)	Ø CH-3: RV404/AU-93₽ (A-4)
• EE mode	310±3 kHz	
	Step2 TP454/AU-93P (C-3)	⊘ CH-4: RV454/AU-93P (C-4)
	540±3 kHz	

10-24. AFM DEVIATION ADJUSTMENT

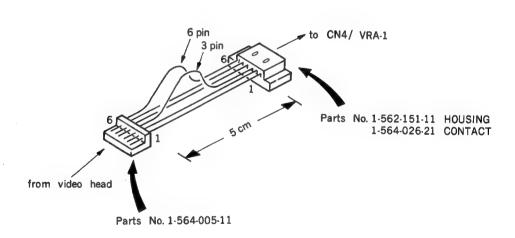
[Connection]

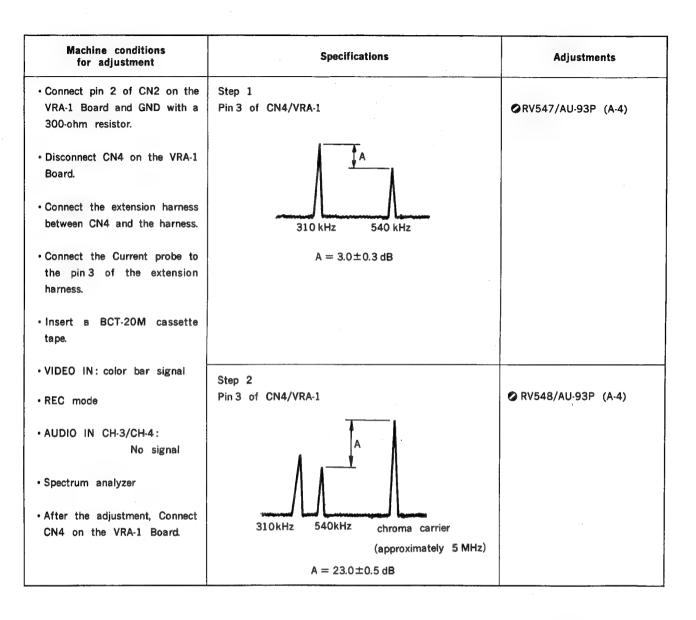


Machine conditions for adjustment	Specifications	Adjustments
• AUDIO IN CH-3/CH-4: 400 Hz, +4 dBs	CH-3: TP404/AU-93P (A-3) CH-4: TP454/AU-93P (C-3)	◆ CH-3: RV403/AU-93P (A-3) ◆ CH-4: RV453/AU-93P (B-3)
• Insert a BCT-20M cassette tape.	25±0.2 kHz	
• REC mode		

10-25. AFM RECORDING CURRENT ADJUSTMENT

Prepare the extension harness for adjustment as follows;





10-26. AFM PB RF LEVEL ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
• AUDIO IN CH-3/CH-4: No signal	TP502/AU-93P (A-3)	⊘ RV550/AU-93P (A-2)
Play back the color bar signal on the alignment tape CR5-1B PS.	A	
	$A = 2.0 \pm 0.1 \text{ Vp-p}$	

10-27. AFM PB LEVEL ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
 Play back the color bar signal on the alignment tape CR5-1B PS. 	Step 1 CH-3: TP402/AU-93P (B-2) CH-4: TP452/AU-93P (B-2)	◆ CH-3: RV402/AU-93P (C-4) ◆ CH-4: RV452/AU-93P (B-4)
	-19.5±0.2dBs -19.5±0.2dBs Step 2 AUDIO OUT CH-3 connector (terminated at 600 ohms). AUDIO OUT CH-4 connector (terminated at 600 ohms) 4±0.5 dBm	CH-3: Front panel: CH-3 PB VR ○CH-4: Front panel: CH-4 PB VR

10-28. AFM D.O.C. LEVEL ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
• AUDIO IN CH-3/CH-4: No signal	Pin 10 of IC503/AU-93P (A-1)	⊘ RV551/AU-93P (A-2)
 Playback the color bar signal on the alignment tape CR-5-1B PS. 	A	
	$A = 500\pm10 \text{ mVp-p}$	

10-29. AFM D.O.C. PULSE WIDTH ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
• AUDIO IN CH-3/CH-4: No signal	TP503/AU-93P (A-3)	⊘ RV549/AU-93P (B-2)
Play back the color bar signal on the alignment tape CR5-1B PS.		
	$A = 12 \pm_0^1 \mu \text{sec}$	

SECTION 11 VIDEO SYSTEM ALIGNMENT

[Equipment Required]

- · Dual trace oscilloscope
- · Frequency counter
- PAL signal generator (TEKTRONIX 1411 or equivalent)
- Component signal generator (TEKTRONIX TSG-300 or equivalent)
- · Sweep generator
- Vectorscope
- Waveform monitor
- · Component waveform monitor (TEKTRONIX WFM-300 or equivalent)
- · Waveform vector monitor (TEKTRONIX 1751 or equivalent)
- VISC doubler
- · Spectrum analyzer
- · Digital voltmeter
- · Shorting clip
- Blank tape (BCT-20K or equivalent)
- Blank tape (BCT-20M or equivalent)
- · BETACAM (SONY BVW-75P or equivalent)
- Alignment tape CR5-2A PS (96-0098-44)

Contents

TIME min. sec	VIDEO TRACK
0: 00 3: 00 —	75% Color Bars
6: 00	Multi Burst
9: 55	Bowtie & 10T
11:00-	Pulse & Bar
13: 00 —	Quad Phase
	C-Monoscope (Switching position) is shifted.
15: 00	

• Alignment tape CR5-1B PS (8-960-096-91) Contents

TIME, min, sec	VIDEO TRACK	AFM
0: 00	RF Sweep	
2: 00	60% Η Sweep (CTDM)	
5: 00 ——	Pulse & Bar (CTDM)	No-Signal
8: 00 ——	Multi Sweep	
11:00	Pulse & Bar	
14: 00	Tuise & Dai	400 Hz SINE WAVE
16: 30	100% Color Bars	25 kHz DEVIATION
17:00	Bowtie & 10T	75 kHz DEVIATION
19:00 ——	Line 17A Signal	
22:00	Quad Phase	
24:00 ——	Flat Field	No-Signal
26: 00	100% Color Bar	
28: 00	with Dropout Composite H Sweep	
30:00	with VISC	

[Switch Setting]

Connector Panel

• EE SELECT SW; NORMAL

· VIDEO SW; LINE

· TBC SW; OFF

· DUB SW; CH-2

· CONFI SW; OFF

• TRACKING VR; center clicked position

These switches should not be touched unless otherwise specified.

All of the Video boards (CEC-3P, DEC-49P, ENC-11P and MDM-3P) should be extended with an extension board (EX-150 Board).

11-1. MDM BOARD ALIGNMENT (PLAYBACK SYSTEM)

11-1-1. Y RF Balance/Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
 Play back the flat field signal on the alignment tape CR5-1B PS. Maximize the RF signal level with the TRACKING control knob. 	TP301/MDM-3P(F-4) Spec.1 A = 0.60 ± 0.05 V Spec.2 B C	 RV601/PA-60A[A301](F-4) RV602/PA-60A[A301](F-4)
	CH-A CH-B B=C TRIG: TP308/MDM-3P(F-3)	

11-1-2. Y AGC Adjustment

Machine conditions for adjustment	Specifications	Adjustments
 Set RV305 on the MDM-3P Board(G-4) to the mechanical center position. Play back the flat field signal on the alignment tape CR5-1B PS. 	A A A=0.5±0.05 V	⊘ RV603/RF-16A[A302](F-3)
	TRIG: TP308/MDM-3P(F-3)	

11-1-3. Y HF Input Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
 Play back the flat field signal on the alignment tape CR5-1B PS. 	TP303/MDM-3P(F-2) A A=0.10±0.01 V TRIG: TP308/MDM-3P(F-3)	⊘ RV607/EQ-14[A303](F-3)
Step. 2	TP303/MDM-3P(F-2)	⊘ RV620/FL-66
Play back the flat field signal on the alignment tape CR5-2A PS.	A=0.20±0.01 V	
	TRIG: TP308/MDM-3P(F-3)	

11-1-4. C RF Balance Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· Play back the flat field signal	TP401/MDM-3P(D-3)	
on the alignment tape CR5-1B PS.	Spec.1	⊘ RV602/PA-60A[A401](E-4)
Maximize the RF level with the TRACKING control knob.		
	A=0.50±0.05 V	
	Spec.2	
	CH-A CH-B	
	TRIG: TP408/MDM-3	3P(F-1)

11-1-5. C AGC Adjustment

Machine conditions for adjustment	Specifications	Adjustments
• Play back the flat field signal on the alignment tape CR5-1B PS.	A=0.6±0.05 V	⊘ RV603/RF-16A[A402](E-3)
	TRIG: TP408/MDM-3P(F-1)	

11-1-6. C HF Input Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Play back the flat field signal on the alignment tape CR5-1B PS.	A=0.2±0.01 V	⊘ RV607/EQ-14A[A403](E-3)
	TRIG: TP408/MDM-3P(F-1)	

11-1-7. Y Carrier Balance Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Play back the color bar signal on the alignment tape CR5-2A PS.	TP306/MDM-3P(F-4)	 RV302/MDM-3P(F-2) RV608/DM-58[A304](G-1) Alternately adjust.
	A≦100mV	
Step. 2 (Check)	TP306/MDM-3P(F-4)	
• Play back the 60% H sweep (CTDM) signal on the align- ment tape CR5-1B PS.	100 % 3MHz A≤10%	

11-1-8. C Carrier Balance Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Play back the color bar signal on the alignment tape CR5-2A PS.	TP406/MDM-3P(E-4)	◇RV402/MDM-3P(D-2)◇RV608/DM-58[A404](A-1)• Alternately adjust.
Step. 2 (Check)	A≦100mV TP406/MDM-3P(E-4)	
Play back the 60% H sweep (CTDM) signal on the alignment tape CR5-1B PS.	100 % 100 % A ≤ 10%	

11-1-9. Y Output Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
 Play back the color bar signal on the alignment tape CR5-1B PS. 	TP306/MDM-3P(F-4)	⊘ RV609/VA-54[A305] (G·3)
More than twenty seconds should elapse after the color bar signal is played back.	-	
	A=1±0.01 V	

11-1-10. C Output Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Play back the color bar signal on the alignment tape CR5-1B PS.	A=0.93±0.01V (Measure in the center of noise)	

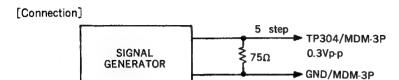
11-1-11. Y D.O.C Sensitivity Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Step. 1		
 Play back the flat field signal on the alignment tape CR5-1B PS. 	pin 2 of DO-19 [A307]/MDM-3P(E-3) V sync	
 Maximize the DC level with the TRACKING control knob. 	ENVELOPE dc level	
Step. 2		
• PB PAUSE mode	CH-1: pin 2 of DO-19 [A307]/MDM-3P(E-3) CH-2: TP307/MDM-3P(F-4) pin 2 of	Metal:
Step. 3		
 Check that no white noise appears near the guard band on a monitor. 		
Step. 4		
 Play back the dropout check signal on the alignment tape CR5-1B PS. 	Check that the dropout portion is compensated on the monitor.	

11-1-12. C D.O.C Sensitivity Adjustment

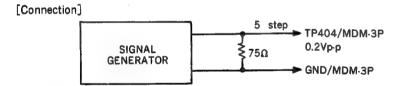
Machine conditions for adjustment	Specifications	Adjustments
• Play back the flat field signal on the alignment tape CR5-1B	pin 5 of DO-19 [A307]/MDM-3P(E-3)	
PS.	V sync	
 Maximize the DC level with the TRACKING control knob. 	ENVELOPE dc level	
Step. 2		
• PB PAUSE mode	CH-1: pin 5 of DO-19/MDM-3P(E-3) CH-2: TP407/MDM-3P(C-1)	⊘ RV624/DO-19[A307](E-2)
	pin 5 of — ENVELOPE DO-19 TP407 5 Vdc — DO PULSE	
	0 Vdc	
Step. 3		
 Check that no white noise appears near the guard band on a monitor. 	·	
Step. 4		
 Play back the dropout check signal on the alignment tape CR5-1B PS. 	Check that the dropout portion is compensated on the monitor.	,

11-1-13. Y CCD Bias Adjustment



Machine conditions for adjustment	Specifications	Adjustments
Remove the solder bridge from	TP305/MDM-3P(G-4)	◆ RV610/DL-13[A306](F-4)
SL1 on the MDM-3P Board(G-1). Supply 5-step signal to TP304 on the MDM-3P Board(G-1). Waveform moniter: DIFF'D STEP mode	100%	
PLAY mode (without inserting a cassette tape) After the adjustment, solder SL1 to the former position.	A≦5% (Flat or the amplitude is decreased to the right)	

11-1-14. C CCD Bias Adjustment



Machine conditions for adjustment	Specifications	Adjustments	
• Remove the SL2 on the MDM-3P Board(A-1).	TP405/MDM-3P(C-1)	RV610/DL-13[A406](D-2)	
 Supply 5-step signal to TP404 on the MDM-3P Board (A-1). Waveform monitor: DIFF'D STEP mode 	100 %		
PLAY mode (without inserting a cassette tape)	A ≤5% (Flat or the amplitude is		
 After the adjustment, solder the SL2 to the former posi- tion. 	decreased to the right)		

11-1-15. Y D.O.C Replacement Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Play back dropout check signal on the alignment tape CR5-1B PS.	TP306/MDM-3P(F-4) Sync TIP Spec. 1 Adjust the sync tip level. Spec. 2 Adjust the 3rd step at the dropout portion. TRIG: TP44/SV-94P(J-1)	Spec. 1

11-1-16. C D.O.C Replacement Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Play back dropout check signal on the alignment tape CR5-1B PS.	SPEC. 1 Adjust the sync tip level Spec. 2 Adjust the pedestal level TRIG: TP44/SV-94P(J-1)	Spec. 1

11-1-17. Y PB Frequency Response Adjustment (METAL)

Machine conditions for adjustment	Specifications	Adjustments
Play back the gated sweep (CTDM) signal on the align-	TP306/MDM-3P(F-4) Spec. 1	CH-A: Prv605/EQ-14[A303](F-3)
ment tape CR5-1B PS.	0.5 1 2 3 4 5 MHz	CH-B: ◆RV606/EQ-14[A303](F-3)
	Frequency Level	
	0.5 MHz 100%(reference)	
	1 MHz 100±5 %	
	2 MHz 100±5 %	
	3 MHz 100±5 %	
	4 MHz 100±5 %	
	5 MHz 100 %	
	Read in the center of moire	
	Spec. 2	
	The difference between the CH-A and CH-B should	
	be within 5 % at 5MHz.	
	TRIG: TP308/MDM-3P(F-3)	
	[NOTE]	
	When the carrier balance is generated between	
	the CH-A and CH-B, perform section 11-1-7: Y	
	carrier balance adjustment.	

11-1-18. Y Equalizer Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Play back the Pulse/bar (CTDM) signal on the alignment tape CR5-1B PS.	TP306/MDM-3P(F-4) A = B	⊘ RV619/FL-66

11-1-19. C PB Frequency Respose Adjustment (METAL)

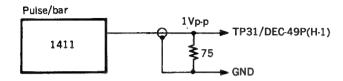
Machine conditions for adjustment	Sp	ecifications		Adjustments
• Play back the gated sweep	TP406/MDM-3P(E-4)			
(CTDM) signal on the align-	Spec. 1			CH-A:
ment tape CR5-1B PS.	1	1		◆RV605/EQ-14A[A403](E-3)
·				CH-B:
	0.5 1	2 3 4MHz		⊘ RV606/EQ-14A[A403](E-3)
	Frequency	Level		
	0.5 MHz	100% (reference)		
	1 MHz	100±5%		
	2 MHz	100±5%		
	3 MHz	90 %		
Į	Read in th	e center of moire.		
	Spec. 2			
	The difference between			
	be within 5% at 3	BMHz.		
		TRIG: TP408/M	/IDM-3P(F-1)	

11-2. DEC BOARD ALIGNMENT

11-2-1. Y Noise Canceller Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Play back the color bar signal on the alignment tape CR5-1B PS.	TP31/DEC-49P(H-1) A=1.0 +0.02 V	●RV101/ENC-11P(H-1)
Step. 2 • Play back the color bar signal on the alignment tape CR5-1B PS.	VIDEO OUT connector (terminated at 75 ohms) $A=1.0 \pm ^{0}_{0.02} \text{ Vp-p}$	⊘ RV201/DEC-49P(H-1)

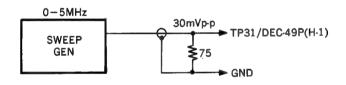
[Connection]



Machine conditions for adjustment	Specifications	Adjustments
· Insert the alignment tape	TP34/DEC-49P(H-3)	◆ RV203/DEC-49P(H-3)
CR5-1B PS, and then put the unit into the PB mode.	0 0 0	
 Disconnect CN2 on the DEC- 49P Board. 		
	-\\-\-\-\-\-\-\-\-\-\-\-\-\-\-\-\-\-\-	
	Make flat the center of the noise.	

Step 4.

[Connection]



Machine conditions for adjustment	Specifications	Adjustments
• Insert the alignment tape CR5-1B PS, and then put the	TP33/DEC-49P(G-2)	
unit into the PB mode.		
After the adjustment, connect CN2 on the DEC-49P Board.	Adjust as the above illustration.	



11-2-2. DEC Input Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments	
Set the VIDEO LEVEL VR knob to the center clicked position.	TP1/DEC-49P(E-4)	⊘ RV2/BF-29	
VIDEO IN: color bar signal EE mode	A=0.63±0.01 V		

11-2-3. Y Output Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Step. 1		
VIDEO IN: color bar signal (100/0/100/0) EE mode	TP6/DEC-49P(C-4)	
• EE mode		
	A=1.00±0.01 V	
Step. 2		
· VIDEO SW: CAMERA	TP6/DEC-49P(C-4)	▼ RV508/DEC-49P(C-3)
• CAMERA IN: color bar signal (100% White)		
• EE mode		
	A=1.00±0.01 V	

11-2-4. Chroma Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
VIDEO IN: color bar signal (100-100-0) EE mode	TP3/DEC-49P(F-1) TP8/DEC-49P(F-1) TP9/DEC-49P(F-1)	 RV301/DEC-49P(F-1) RV303/DEC-49P(F-1) RV302/DEC-49P(F-1)
	A=1.00±0.01V	

11-2-5. Y/C Mix Level Tentative Adjustment

Machine conditions for adjustment	Specifications	Adjustments
VIDEO IN: color bar signal (Y OFF) EE model	TP5/DEC-49P(G-3)	 RV501/DEC-49P(G-4) RV502/DEC-49P(G-4) Alternately adjust
TE Model		
	— ************* A	
	Minimize the chroma leak. (A≨20mVp-p)	
	TRIG: TP20/DEC-49P(C-4)	

11-2-6. Carrier Leak Canceller Adjustment

Machine conditions for adjustment	Specifications	Adjustments
• VIDEO IN: color bar signal (Y OFF)	Step. 1 TP5/DEC-49P(G-3)	⊘ RV502/DEC-49P(G-4)
• EE mode	######################################	
	TRIG: TP20/DEC-49P(C-4)	
	Step. 2 TP6/DEC-49P(C-4)	RV401/DEC-49P(F-2) RV503/DEC49P(F-3) Alternately adjust.
	Minimize the chroma leak. (A≤20 mVp-p)	
	TRIG: TP20/DEC-49P(C-4)	

11-2-7. Y/C Mix Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
• VIDEO IN: color bar signal	TP5/DEC-49P(G-3)	⊘ RV501/DEC-49P(G-4)
(Y OFF)		
• EE mode		Alternately adjust.
	Minimize the chroma leak.	
	(A ≦20 mVp-p)	
	TRIG: TP20/DEC-49P(C-4)	

11-2-8. Sampling Pulse Timing Adjustment

Machine conditions for adjustment	Specifications	Adjustments
VIDEO IN: color bar signal	CH-1: TP6/DEC-49P(C-4)	
• EE mode	CH-2: TP21/DEC-49P(B-2)	
	TP9	
	TP16	
	$A = 6.0 \pm ^{+0.1}_{-0} \mu sec$	
	TRIG: TP1/DEC-49P(E-4)	

11-2-9. Blanking Timing Adjustment

Machine conditions for adjustment	Specifications	Adjustments
VIDEO IN : color bar signal	CH-1: TP6/DEC-49P(C-4) CH-2: TP14/DEC-49P(D-3)	
• EE mode		
	TP14	
	A=9.8 ±0.1 µ sec	

11-2-10. DEC HUE Adjustment

Machine conditions for adjustment	Specifications	Adjustments
• VIDEO IN : color bar signal (100-100-0)	CH-1: TP14/DEC-49P(D-3) CH-2: TP15/DEC-49P(D-3)	
• EE mode	TP14 B-Y	
	TP15 R-Y Minimize A	
	TRIG: TP20/DEC-49P(C-4)	·

11-2-11. Blanking Level Adjustment

Specifications	Adjustments
TP14/DEC-49P(D-3)	⊘ RV602/DEC-49P(D-2)
B-Y	
A=0±4 mV	
TRIG: TP20/DEC-49P(C-4)	
TP15/DEC-49P(D-3)	▼ RV606/DEC-49P(C-2)
R-Y	
A TO TAME	
	TP14/DEC-49P(D-3) B-Y A A=0±4 mV TRIG: TP20/DEC-49P(C-4) TP15/DEC-49P(D-3)

11-3. CEC BOARD ALIGNMENT

11-3-1. Chroma AFC 1/8 Clock Adjustment

Step. 1

Machine conditions for adjustment	Specifications	Adjustments
Play back the color bar signal on the alignment tape CR5-2A PS.	TP504/CEC-3P(B-3)	⊘ RV503/CEC-3P(A-3)
	Minimize the clock deflection. $A=0\pm20$ nsec	

Step. 2

Machine conditions for adjustment	Specifications	Adjustments
• VIDEO IN: color bar signal	TP504/CEC-3P(B-3)	
• EE mode	A Minimize the clock deflection.	
	A=0±20 nsec	

11-3-2. Y AFC 1/8 Clock Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Play back the color bar signal on the alignment tape CR5-2A PS.	Minimize the clock deflection. $A=0\pm20 \text{ nsec}$	⊘ RV505/CEC-3P(A-3)

Machine conditions

for adjustment

• Turn the RV1 on the LM-16 Board (E-2) fully clockwise

Step 1.

○RV11/DL-15[A152](C-1)

Step 2.

RV11/DL-15[A153](A-1)

Step 3.

RV21/DL-15[A152](B-1)

Step 4.

Spec 2:

Step 1.

Step 3.

Step 4.

⊘ RV21/DL-15[A153](B-1)

⊘ RV12/DL-15[A153](A-1)

RV22/DL-15[A152](B-1)

⊘ RV22/DL-15[A153](B-1)

• EE mode

· CAMERA IN: 5-step signal

. VIDEO SW: CAMERA

direction.

· Waveform monitor:

DIFF'D STEP mode

• Turn the RVs on the DL-15 Board [A152 through A155] fully counterclockwise direction.

pin 31 of CN1/CEC-3P(C-4)

pin 31 of CN1/CEC-3P(C-4)

waveform monitor

100 %

Specifications

Spec 1. A=0.47±0.01V

TRIG: TP152/CEC-3P(D-3)

Spec 2. $A=0\pm_{4}^{0}\%$

pin 31 of CN1/CEC-3P(C-4)

pin 31 of CN1/CEC-3P(C-4)

waveform monitor

Step 3. A=0.93±0.01 V

Spec 3.:

Step 1.

Step 2.

②RV11/DL·15[A155](A-2)

Step 3.

ORV21/DL-15[A154](B-1)

Spec 4:

Step 1.

⊘ RV12/DL-15[A154](C-1)

Step 3.

100 %

Step 4.

②RV22/DL-15[A155](B-2)

• After the adjustment, perform 11-3-5. Chroma Limiter Adjustment.

Spec 4. $A=0\pm_{4}^{0}\%$

11-3-4. Expand/Compress CCD Output Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	pin 31 of CN1/CEC-3P(C-4)	
CAMERA IN: color bar signal		ORV11/DL-15[A155](B-2)
• EE mode	-7	⊘ RV21/DL-15[A155](A-2)
	A=0.93±0.01V	
·	TRIG: TP152/CEC-3P(D-3)	

11-3-5. Chroma Limiter Adjustment

Machine conditions for adjustment	Specifications	Adjustments
• VIDEO IN: color bar signal pin (chroma: +6dB)	pin 31 of CN1/CEC-3P(C-4)	⊘ RV1/LM-16(E-2)
• EE mode		
	$A=0.62\pm^{0.01}_{0}V$	

11-3-6. CTDM Compress Start Timing Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	CH-1: TP132/ENC-6P(G-2)	⊘ RV502/CEC-3P(B-3)
CAMERA IN: color bar signal	CH-2 : TP7/CEC-3P(E-4)	
• EE mode	TP132	
	TP7	
		·
	TP132 50%	
	TP7	
	A=2.85±0.05 μS	

11-3-7. Pre ϕ CCD Linearity Adjustment

Machine conditions for adjustment	Specifications	Adjustments
 Play back the C Linearity signal on the alignment tape CR5.1B PS. Waveform monitor: DIFF'D STEP mode After the adjustment, solder the slit to the former position. 	TP1/CEC-3P(G-2) A=0 +0%	⊘ RV1/DL-14[A101](E-4)

11-3-8. Pre ϕ CCD Output Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Play back the color bar signal on the alignment tape CR5-1B PS.	TP1/CEC-3P(G-2)	ØRV2/CEC-3P(G-3)
	A=0.93±0.01V	

11-3-9. C Nonlinear De-emphasis Adjustment

Step 1.

Machine conditions for adjustment	Specifications	Adjustments
Play back the color bar signal on the alignment tape CR5-1B PS.	TP2/CEC-3P(F-2)	⊘ RV1/NR·18(G-4)
	A=0.93±0.01V	

Step 2.

Machine conditions for adjustment	Specifications	Adjustments
 Play back the color bar signal on the alignment tape CR5-1B 	TP15/NR-18(G-4)	⊘ RV3/NR·18(G·4)
 PS. Turn RV4 on the NR-18 Board (G-4) to the mecanical center position. 	A	
	A=B	

Step 4.

Machine conditions for adjustment	Specifications	Adjustments
 Playback the color bar signal on the alignment tape CR5-1B PS. 	TP2/CEC-3P(F-2) A=0.93±0.01V	Ø RV1/NR-18(G-4)

11-3-10. C Noise Canceller Adjustment

Step 1.

Machine conditions for adjustment	Specifications	Adjustments
Play back the color bar signal on the alignment tape CR5-2A PS.	TP2/CEC-3P(F-2)	⊘ RV5/NR·18(G·4)
	A=0.7±0.01V	

Step 2.

Machine conditions for adjustment	Specifications	Adjustments
• Play back the guad phase signal portion on the alignment tape CR5-2A PS.	Minimize the overshoot or smear.	RV7/NR-18(G-4) RV6/NR-18(G-4) Alternately adjust RV6 and RV7 to meet the specification.
	Minimize the noise.	

11-3-11. Pre ϕ C SH Adjustment

Machine conditions for adjustment	Specifications	Adjustments
 Play back the color bar signal on the alignment tape CR5-1B PS. 	CH-1: TP2/CEC-3P(F-2) CH-2: TP7/CEC-3P(E-4)	⊘ RV501/CEC-3P(A-1)
	TP7	
	A	
	A=2.30±0.05μsec	

11-3-12. Pre ϕ Y SH Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Play back the color bar signal on the alignment tape CR5-1B PS.	CH-1: TP6/CEC-3P(E-4) CH-2: TP7/CEC-3P(E-4)	⊘ RV4/CEC-3P(F-3)
	TP6	
	ТР7	
,	A	
	$A=0.85\pm0.05\mu sec$ (center of jitter)	

11-3-13. Pre ϕ Limiter Adjustment

Step 1.

Machine conditions for adjustment	Specifications	Adjustments
• Connect TP8 on the CEC-3P	TP7/CEC-3P(E-4)	⊘ RV2/LM-15[A105](E-3)
Board (G-4) to E1 on the		
CEC-3P Board (F-2) with a		
shorting clip.		
Play back the color bar signal		
on the alignment tape CR5-1B		
PS.	When connecting	
	TP8 to E1	
	•	
	A	
	$A=16\pm2\mu sec$ Read at the top of jitter.	
After the Adjustment, remove		
the shorting clip.	TRIG: TP6/CEC-3P(E-4)	

Step 2

Machine conditions for adjustment	Specifications	Adjustments
· Connect TP8 on the CEC-3P	TP7/CEC-3P(E-4)	ØRV1/LM-15[A105](E-3)
Board (G-4) to TP12 on the		
CEC-3P Board (E-4) with a		
shorting clip.		
	# # # # # # # # # # # # # # # # # # #	
Play back the color bar signal		
on the alignment tape CR5-1B	When connecting	
PS.	TP8 to TP12	
	,	
	A	
	$A=16\pm2\mu sec$	
After the adjustment, remove	Read at the top of jitter.	
the shorting clip.		
	TRIG: TP6/CEC-3P(E-4)	

11-3-14. DUB CTDM Linearity Adjustment

Step 1.

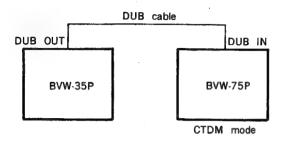
Machine conditions for adjustment	Specifications	Adjustments
 Play back the C linearity signal on the alignment tape CR5-1B PS. Waveform monitor: DIFF'D STEP mode 	TP3/CEC-3P(G-1) A = +0%	⊘ RV1/DL-14[A103](G-1)

Step 2.

Machine conditions for adjustment	Specifications	Adjustments
 Play back the C linearity signal on the alignment tape CR5-1B PS. Waveform monitor: DIFF'D STEP mode 	TP4/CEC-3P(F-2)	⊘ RV1/DL-14[A104] (G-1)
	$A = {}^{+0}_{-4}\%$	

11-3-15. DUB CTDM Level Adjustment

[Connection]



Machine conditions for adjustment	Specifications	Adjustments
 Play back the color bar signal on the alignment tape CR5-1B PS. After the adjustment, remove the DUB cable. 	TP5/CEC-3P(D-4)	⊘ RV3/CEC-3P(G-2)
	A=0.62±0.01V	

11-3-16. R-Y Comb CCD Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Play back the color bar signal on the alignment tape CR5-1B PS.	Spec 1. Symmetrize the waveform. Spec 2. Minimize the level. (A≤0.2V) TRIG: TP13/CEC-3P(D-4)	Spec 1. RV21/DL-17(C-4) Spec 2. RV22/DL-17(C-4) Alternately adjust until specification 2 is satisfied.

11-3-18. Expanded Output Level Adjustment (METAL)

Machine conditions for adjustment	Specifications	Adjustments
• Set S1 on the CEC-3P Board (G-3) to ON.	TP14/CEC-3P(E-4)	◆RV151/CEC-3P(B-2)
Play back the color bar signal on the alignment tape CR5-1B PS.	R-YA	,
	A=0.70±0.05V	
	TP13/CEC-3P(D-4)	
	B=0.70±0.05V	

11-3-19. Free-Run Timing Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Play back the color bar (D0) signal portion on the alignment tape CR5-1B PS.	VIDEO OUT connector (terminated at 75 ohms)	⊘ RV504/CEC-3P(A-2)
 Turn the TRACKING control VR counterclockwise or clock- wise direction to generate the chroma tearing by sync distur- bance. 		
	Coincide	
	When turning the TRACKING control VR counterclockwise or clockwise direction, the chroma tearing by sync disturbance should not appear. *Red or green noise may appear. This noise is not related to this adjustment.	

11-4. ENC BOARD ALIGNMENT

11-4-1. Y Pedestal Difference in Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	VIDEO OUT connector (terminated at 75ohms)	⊘ RV130/ENC-11P(G-3)
• CAMERA IN: color bar signal	r _~	,
• EE mode		
• Waveform monitor		
	- -	
	- A.	
	A = 0±0.5 mV	
	$A = 0 \pm 0.5 \text{ mV}$	

11-4-2. Y Sync Replacement Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	VIDEO OUT connector (terminated at 75 ohms)	⊘ RV131/ENC-11P(H-2)
• Set S1 on the ENC-11P Board (C-1) to ON.		
• CAMERA IN: color bar signal		
• EE mode	Ų Ų	
Waveform monitor		
After the adjustment, set S1 on the ENC-11P Board (C-1) to 0FF.		
	A = 300±1 mV	

11-4-3. Y Pedestal Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	TP133/ENC-11P(E-1)	⊘ RV137/ENC-11P(F-1)
• Set S1 on the ENC-11P Board (C-1) to ON.		
• CAMERA IN: color bar signal	-	
• EE mode	GND level	
After the adjustment, set S1 on the ENC-11P Board (C-1)		
to OFF.)	
	↓A OND Invit	
-	GND level	
	A=0±0.01Vdc	

11-4-4. Y EE Output Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	VIDEO OUT connector (terminated at 75 ohms)	2 RV134/ENC-11P(G-1)
• Set S1 on the ENC-11P Board (C-1) to ON.		
CAMERA IN: color bar signal (100% White)		
• EE mode	^	
Waveform monitor		
After the adjustment, set S1 on the ENC-11P Board (C-1) to OFF.	$A = 1.00 \pm 0.01 \text{ V}$	

11-4-5. Y DUB Out Adjustment

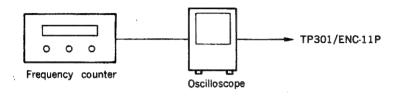
Machine conditions for adjustment	Specifications	Adjustments
· Connect the DUB OUT to the	TP402/ENC-11P(E-4)	Step. 1
DUB IN on the BVW-75P with		Metal mode
a DUB cable.		Oxide mode
• S1/ENC-11P(C-1): ON		
Step. 1 PB mode		© RV132/ENC-11P(G-2)
• BVW-75P : CTDM mode		
Play back the color bar signal		
on the alignment tape		
CR5-1B PS (Metal mode adj.)	A	
CR5-2A PS (Oxide mode adj.)		
Step. 2 EE mode		
• BVW-75P: Y-R, B mode	^	
· VIDEO SW: CAMERA		
· CAMERA IN: Color bar	PB mode) A 10+001V	
signal (100% WHITE)	EE mode $A = 1.0 \pm 0.01 V$	
• EE mode		
· After the adjustment, set S1		
on the ENC-11P Board (C-1)		
to OFF, and remove the DUB		
cable.		

11-4-6. SC Tuning Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	TP301/ENC-11P(D-3)	⊘ LV321/ENC-11P(D-3)
• CAMERA IN: color bar signal		
• EE mode	A	1
	Maximize A (A ≒ 3 V)	

11-4-7. 4.43MHz OSC Adjustment

[Connection]



Machine conditions for adjustment	Specifications	Adjustments
Wait for more than three minutes after the power is turned on.	TP301/ENC-11P(D-3)	⊘ CV351/ENC-11P(C-2)
· VIDEO SW: CAMERA	4.433619MHz±5 Hz	
• CAMERA IN: color bar signal	4.400025111112=0 (12	
• EE mode		
• Frequency counter	•	·

11-4-8. Clamp Pulse Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	CH-1: TP501/ENC-11P(C-3) CH-2: TP506/ENC-11P(A-4)	⊘ RV504/ENC-11P(A-4)
CAMERA IN: color bar signal		
Waveform monitor	TP501	
• EE mode	TP506	
 Wait for more than one minute and thirty seconds 	A -	
after the EE mode.	A=8.1±0.05μs	

11-4-9. Chroma Blanking Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	VIDEO OUT connector (terminated at 75 ohms)	B-Y(H axis)
• CAMERA IN: color bar signal	لمرير	⊘ RV202/ENC-11P(G-3)
		R-Y(V axis)
Waveform monitor	<u> </u>	
• EE mode		Alternately adjust
	1 1 1	
	www.www.	
	Minimize A	

11-4-10. Chroma Carrier Balance Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	VIDEO OUT connector (terminated at 75 ohms)	
CAMERA IN: color bar signal		⊘ RV241/ENC-11P(E-3)
• Waveform monitor	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	Alternately adjust.
• EE mode		
• Wait for more than one	A A	
minute and thirty seconds after the EE mode.	- And Washington	
	Minimize A	
	(A ≦ 14 mV)	

11-4-11. Chroma Balance Vertical Adjustment

Specifications	Adjustments
VIDEO OUT connector (terminated at 75 ohms.)	⊘ RV302/ENC-11P(D-3)
When the luminescent spot is in the vertical line.	
75% A B	
When the luminescent spot is in the horizontal line. vectorscope A' 75%	
	VIDEO OUT connector (terminated at 75 ohms.) When the luminescent spot is in the vertical line. vectorscope A B When the luminescent spot is in the horizontal line. vectorscope A' 75%

11-4-12. Chroma Balance Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	VIDEO OUT connector (terminated at 75 ohms)	Ø RV203/ENC-11P(F-3)
CAMERA IN: color bar signal	Luminescent spots on vectorscope	
• EE mode		
• Set the vectorscope gain to UNCAL, and adjust so that R and C _Y are located in "\leftarrow".		
	○ : OK	
	Papert until twolve luminoscent and antique the	
	Repeat until twelve luminescent spots satisfy the specification.	

11-4-13. Burst Balance/Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	VIDEO OUT connector (terminated at 75 ohms.)	Balance
CAMERA IN: color bar signal	vectorscope	○ RV243/ENC-11P(E-2) Level
• EE mode		⊘ RV301/ENC-11P(D-3)
Set the vectorscope gain to UNCAL, and adjust so that the		
12 luminescent spots are located in "\mathrill".	— ○ : ОК ● : NG	
After the adjustment, set the vectorscope gain to CAL.	75% Balance Adj :The burst level should be same. Level Adj :Place the luminescent spot of burst at 75% position on the BURST axis.	

11-4-14. Chroma Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	VIDEO OUT connector (terminated at 75 ohms)	⊘ RV135/ENC-11P(F-1)
CAMERA IN: color bar signal	vectorscope Burst's luminescent spot: 75%	
• EE mode	75%	
	12 luminescent spots: a half part of the luminescent spot should be located in "\begin{array}{c}" respectively.	

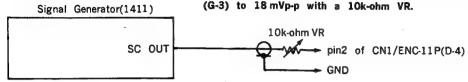
11-4-15. Video Out Y/C Delay Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	VIDEO OUT connector (terminated at 75 ohms)	⊘RV133/ENC-11P(G-1)
CAMERA IN: pulse/bar signal		When the peak is not satisfied the specification.
• EE mode		DL101/ENC-11P(H-1) soldering side
Set the line selector in the waveform monitor to OFF.		888
		• Adjust with RV133 changing the tap.
·	The peak is located in the center. Spec.1	
	OK OK NG NG Y delayed Y advanced (0±5 nsec)	
	[NOTE] Check that the specifications 1 and 2 are satisfied on condition that each video board is directry connected to the main unit without an EX-150 extension board.	

11-4-16. SC Leak Cancel Adjustment

[Connection]

*Adjust the SC leak of TP131 on the ENC-11P Board (G-3) to 18 mVp-p with a 10k-ohm VR.



Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	VIDEO OUT connector (terminated at 75 ohms)	level adjustment
CAMERA IN: color bar signal	Γ.	
· Set S1 on the ENC-11P Board	",	phase adjustment
(C-1) to ON.	4	RV138/ENC-11P(E-2)
() ()	<u>"</u>	
• EE mode		
Waveform monitor		
· After the adjustment, set S1	⇒: SC leak	
on the ENC-11P Board (C-1)	Minimize the SC leak level	
to OFF.		

11-4-17. Chroma DUB Out Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Connect DUB OUT to DUB IN on the BVW-75P with DUB cable. VIDEO SW: CAMERA	TP404/ENC-11P(E-4)	R-Y ⊘ RV431/ENC-11P(E-3)
BVW-75P: Y-R, B mode CAMERA IN: color bar signal	R-Y — A	
• EE mode	$A = 0.70 \pm 0.01 \text{ V}$	
	TP403/ENC-11P(E-4)	B-Y ◆ RV421/ENC-11P(E-3)
	B = 0.70±0.01 V	

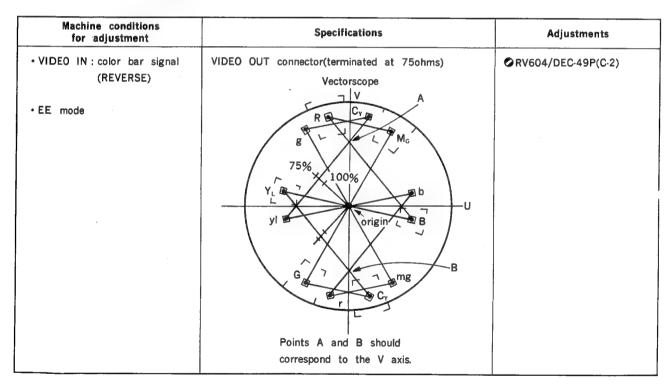
11-4-18. B-Y Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
• VIDEO IN: color bar signal (100/0/100/0) • EE mode	TP14/DEC-49P(C-3) TP403/ENC-11P(E-4) B-Y A=0.70±0.01 V	⊘ RV351/DEC-49P(E-1)

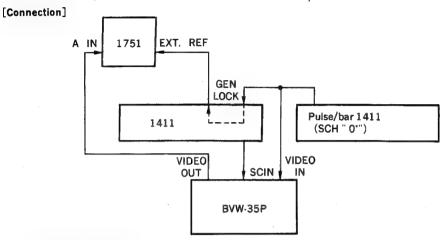
11-4-19. R-Y Level Adjustment

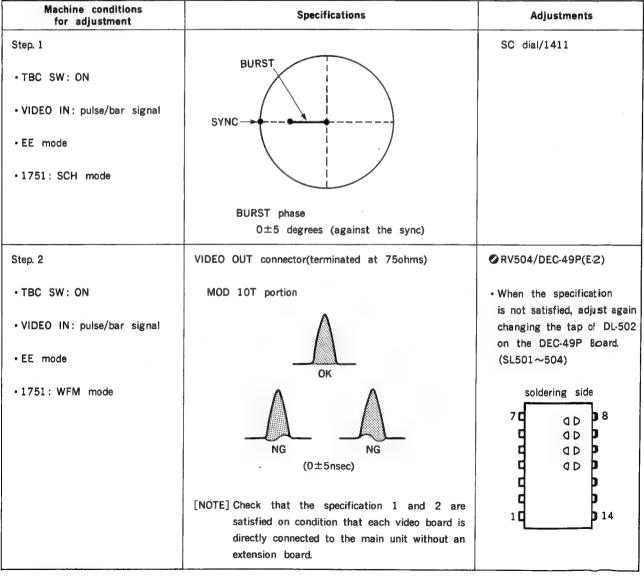
Machine conditions for adjustment	Specifications	Adjustments
VIDEO IN: color bar signal (100/0/100/0) EE mode	TP15/DEC-49P(D-3) TP404/ENC-11P(E-4)	
	A=0.70±0.01 Vp-p	

11-4-20. CC Delay Adjustment



11-4-21. Composite Y/C Delay Adjustment





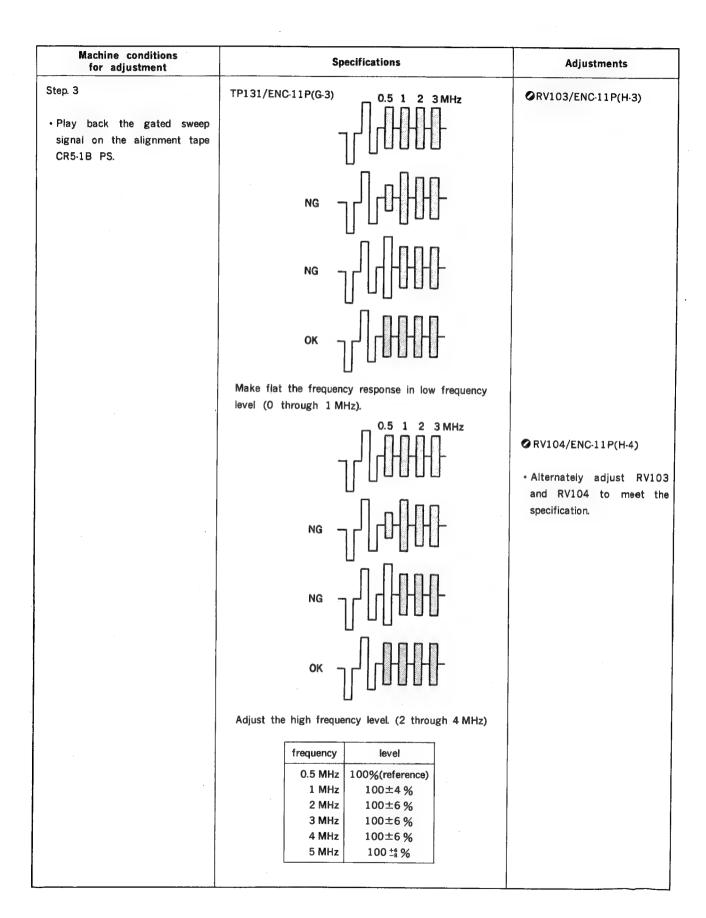
After the adjustment, perform check item in the following adjustment.

11-7-1. VISC Adjustment

11-7-3. CF ID Pulse Adjustment

11-4-22. Y Nonlinear De-emphasis Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Step. 1		© RV101/ENC-11P(H-4)
 Play back the color bar signal on the alignment tape CR5-1B PS. 	TP131/ENC-11P(G-3)	
•		
0. 5	A=1.0±0.01 V	
Step. 2		
 Play back the pulse/bar signal on the alignment tape CR5-1B PS. 	TP101/ENC-11P(G-4)	⊘ RV102/ENC-11P(G-3)
	A B	
	A=B	



Machine conditions for adjustment	Specifications	Adjustments
Step. 4		
Play back the pulse/bar signal on the alignment tape CR5-1B	TP131/ENC-11P(G-3)	
PS.		
	OK NG NG	
	Check the waveform.	
	When the specification is not satisfied, perform	
-	step 2 and 3 again.	

[NOTE] Check that the specification 1 and 2 are satisfied on condition that each video board is directly connected to the main unit without an extension board.

11-4-24. False H Sync Frequency Adjustment

Machine conditions for adjustment	Specifications	Adjustments
 Play back the color bar signal on the alignment tape CR5-2A PS. 	TP505/ENC-11P(C-4)	Ø RV503/ENC-11P(8-4)
	$A = 68 \pm 1 \ \mu \text{sec}$	

11-4-25. H-AFC Error Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO IN: color bar signal	TP503/ENC-11P(B-3)	⊘ LV551/ENC-11P(B-3)
• EE mode	**************************************	
	A	
	A = 2.5±0.1 Vdc	

11-4-26. H-AFC VCO Duty Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO IN: color bar signal	TP504/ENC-11P(B-3)	
• EE mode	50% A B	
•	A: B = 50: 50±2	

11-4-27. PB DUB OUT Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Play back the color bar signal on the alignment tape CR5-1B	DUB OUT connector (terminated at 75 ohms)	
PS.	R-Y	⊘ RV151/CEC-3P(B-2)
	A=0.70±0.01 V	
	B-Y	⊘ RV152/CEC-3P(B-2)
	B=0.70±0.01 V	

11-4-28. Video Out Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
• VIDEO IN: color bar signal	VIDEO OUT connector (terminated at 75 ohms)	● RV505/DEC-49P(E-2)
• EE mode	$A = 1.0 \pm 0.01 \text{ V}$	

11-4-29. DEC Vector Adjustment

Machine conditions for adjustment	Specifications	Adjustments
VIDEO IN: color bar signal EE mode	VIDEO OUT connector (terminated at 75 ohms) vectorscope V A R CY MG 75 % 100% yi origin B B	● RV351/DEC-49P(E-1) ● RV605/DEC-49P(C-1)
	Each spot should be located in each smaller frame.	

11-4-30. VITC Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Step. 1		
VITC REC SW: ON (front panel)	VIDEO OUT connector (terminated at 75 ohms)	●RV511/DEC-49P(E-3)
• VIDEO IN: color bar signal	A	
• EE mode		
· Waveform monitor	A = 0.56±0.03 V	
Step. 2		
VITC REC SW: ON (front panel)	VIDEO OUT connector (terminated at 75 ohms)	⊘ RV510/DEC-49P(C-3)
· VIDEO SW: CAMERA	A	
CAMERA IN: color bar signal		
• EE mode	A = 0.56±0.03 V	
• Waveform monitor		

11-4-31. Video Meter Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Step. 1		
METER select SW: VIDEO (front panel)	CH-1/CH-2 level meter -3	CH-1 meter ⊘RV9/MT-34
· VIDEO SW: CAMERA	׳	CH-2 meter
• CAMERA IN: color bar signal		⊘ RV10/MT-34
• EE mode		
• Put the main unit vertically.		
	The pointer reading should be "+3".	
	CH-3 level meter	
	-3	CH-3 meter
	׳³	⊘ RV11/MT-34
·		
	The pointer reading should be "O".	
Step. 2		
METER select SW: VIDEO	CH-4 level meter	CH-4 meter
(front panel)	-3	⊘ RV12/MT-34
VIDEO IN: color bar signal	׳	
• EE mode		
Put the unit perpendicular to		
the floor.	/	
	The pointer reading should be "O".	

11-5. MDM BOARD ALIGNMENT (EE SYSTEM)

11-5-1. Y Ref Sync Mix Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	TP102/MDM-3P(C-2)	⊘ RV101/MDM-3P(B-2)
CAMERA IN: 50% flat field signal	REF SYNC	
• EE mode	B	
	A:B=4:5	
·	TRIG: TP101/MDM-3P(B-3)	

11-5-2. Y Ref Sync Position Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	TP102/MDM-3P(C-2)	⊘ RV611/TG-31(A-2)
CAMERA IN: 50% flat field signal EE mode	1-(1)	
	Delay 50%	
	A=2.65±0.02μsec TRIG: TP101/MDM-3P(B-3)	

11-5-3. Y Ref Sync Width Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	TP102/MDM-3P(C-2)	⊘RV612/TG-31(B-2)
CAMERA IN: 50% flat field signal		
• EE mode	Delay 50% A A=5±0.05μsec TRIG: TP101/MDM-3P(B-3)	

11-5-4. C Ref Sync Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	TP202/MDM-3P(B-2)	ØRV201/MDM-3P(A-2)
 CAMERA IN: 75% color bar signal Insert a BCT-20K cassette tape. EE mode 		
	With respect to video level A (100 %), the sync level is as follows:	
	B=120±2%	
	TRIG: TP101/MDM-3P(B-3)	

11-5-5. C Ref Sync Width Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	TP202/MDM-3P(B-2)	Ø RV614/TG-31(C-2)
CAMERA IN: 75% color bar signal EE mode	Delay 50%	
	A=1.9±0.05μsec	
	TRIG: TP101/MDM-3P(B-3)	

11-5-6. C Ref Sync Position Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	CH-1: TP102/MDM-3P(C-2)	⊘ RV613/TG-31(B-1)
CAMERA IN: 50% flat field signal	CH-2: TP202/MDM-3P(B-2)	
• EE mode	CH-1	
	CH-2 — — — — — — — — — — — — — — — — — — —	
	CH-1 50%	
	T.P202	
	A=0.25±0.02μsec	
	TRIG: TP101/MDM-3P(B-3)	

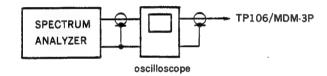
11-5-7. Y Pre-emphasis Mix Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
• VIDEO SW: CAMERA • CAMERA IN: 2T pulse/bar signal • EE mode	Spec 1. A=B Spec 2. C=88±2mV	Spec 1. ② RV102/MDM-3P(B-2) Spec 2. ② RV103/MDM-3P(B-2)
	TRIG: TP101/MDM-3P(B-3)	

11-5-8. C Pre-emphasis Mix Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
VIDEO SW: CAMERA CAMERA IN: 2T pulse/bar signal EE mode	TP203/MDM-3P(A-2) A C Spec 1. A=B	Spec 1.
	Spec 2. C=95±2mV TRIG: TP101/MDM-3P(B-3)	

11-5-9. Y Modulator Deviation/Carrier Set Adjustment



Befor performing this adjustment, perform section 11-1-9. Y Output Level Adjustment (MDM-3P Board).

Step 1.

Machine conditions for adjustment	Specifications	Adjustments
• VIDEO IN: 100% flat field signal	TP106/MDM-3P(B-3)	Deviation adjustment ⊘RV106/MDM-3P(C-2)
• Insert a BCT-20M cassette tape.	dB	Carrier adjustment ⊘RV107/MDM-3P(C-4)
• EE mode		
 Audjust with a spectrum analyzer. 	6.8 7.4 8.8 [MHz]	
	Deviation adjustment Adjust the gap between two peak values to 1.4 MHz.	
	Carrier adjustment Adjust the small peak value on the left to 6.8 MHz.	

Step 2.

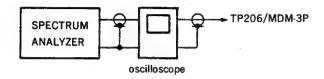
Machine conditions for adjustment	Specifications	Adjustments
VIDEO IN: 100% flat field signal Insert a BCT-20K cassette	TP106/MDM-3P(B-3)	Deviation adjustment RV114/MDM-3P(C-2) Carrier adjustment RV108/MDM-3P(C-4)
tape.		3 ((04)
 Adjust with a spectrum analyzer. 	4.4 5 6.4 [MHz]	
	Deviation adjustment Adjust the gap between two peak values to 1.4 MHz	
	Carrier Adjustment Adjust the low peak on the left to 4.4 MHz.	

Step 3.

Machine conditions for adjustment	Specifications	Adjustments
 Supply 75% color bar signal to the VIDEO IN connector, and put the unit into the self-REC/PB mode. 	TP306/MDM·3P(F-4)	
Check with a metal tape and an oxide tape.	A=1.0±0.01V	
	When the specification is not satisfied, repeat Steps 1. and 2.	

11-5-10. C Modulator Deviation/Carrier Set Adjustment

[Connection]



Befor performing this adjustment, perform section 11-1-10. C Output Level Adjustment (MDM-3P Board).

Step 1.

Machine conditions for adjustment	Specifications	Adjustments
VIDEO IN: 75% color bar signal	TP206/MDM-3P(A-3)	Deviation adjustment • RV206/DV-7
• Insert a BCT-20M cassette tape.	dB And well	Carrier adjustment RV207/MDM-3P(B-4)
• EE mode		
Adjust with a spectrum analyzer.	5.6 MHz 6.1 ±0.005 MHz 6.6 MHz	

Step 2.

Machine conditions for adjustment	Specifications	Adjustments
VIDEO IN: 75% color bar signal	TP206/MDM-3P(A-3)	Deviation adjustment
• Insert a BCT-20K cassette tape.	dB Ann Lund	Carrier adjustment
• EE mode		
Adjust with a spectrum analyzer.	4.0 MHz 4.5±0.005 MHz 5.0 MHz	

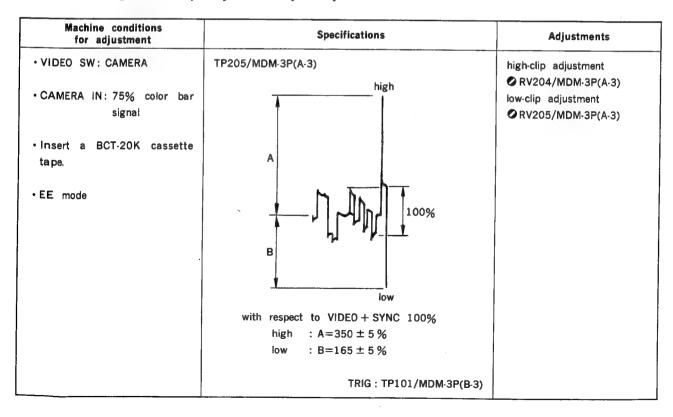
11-5-11. Y White/Dark Clip Adjustment (OXIDE)

Machine conditions for adjustment	Specifications	Adjustments
• VIDEO SW: CAMERA • CAMERA IN: 2T pulse/bar signal • Insert a BCT-20K cassette tape. • EE mode	with respect to VIDEO+SYNC 100% white: A=221.4±2.5% dark: B=65±2.5% TRIG: TP101/MDM-3P(B-3)	white clip adjustment RV104/MDM-3P(B-3) dark clip adjustment RV105/MDM-3P(B-3)

11-5-12. Y Dark Clip Adjustment (METAL)

Machine conditions for adjustment	Specifications	Adjustments
VIDEO SW: CAMERA CAMERA IN: 2T pluse/bar signal Insert a BCT-20M cassette	TP105/MDM-3P(B-3) white	dark clip adjustment RV113/MDM-3P(B-3)
tape. • EE mode	100% dark	
	with respect to VIDEO + SYNC 100% dark: B=100±2.5% TRIG: TP101/MDM-3P(B-3)	

11-5-13. C High/Low Clip Adjustment (OXIDE)



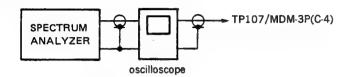
11-5-14. Y REC HF Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	TP108/MDM-3P(C-4)	ØRV109/MDM-3P(C-4)
CAMERA IN: H sweep 140% signal Insert a BCT-20M cassette tapa EE mode	A=50±2mV (measured in the waveform center)	
	TP107/MDM-3P(C-4) A=500±10mV	RV110/MDM-3P(C-4) NOTE: 1. Turn RV110 fully counter- clockwize direction 2. Turn RV110 clockwize direction little by little, and stop to the point that specification is satisfed.

11-5-15. C REC HF Adjustment

Machine conditions for adjustment	Specifications	Adjustments		
· VIDEO SW: CAMERA	TP208/MDM-3P(A-3)			
CAMERA IN: H sweep 140% signal Insert a BCT-20K cassete tape.	A A			
• EE mode	A=20±1 mV (measured in the waveform center)			
	TP207/MDM-3P(A-4)	⊘ RV210/MDM-3P(B-4)		
	A			
	A=350±10 mV			

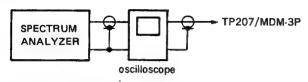
11-5-16. Y Modulator Secondary Distortion Adjustment



Machine conditions for adjustment	Specifications	Adjustments		
· VIDEO SW: CAMERA	TP107/MDM-3P(C-4)	⊘ RV111/MDM-3P(B-4)		
CAMERA IN: 50% flat field signal				
Insert a BCT-20M cassette tape	A			
• EE mode				
• After the adjustment, insert a BCT-20K cassette tape and check that Spec 2. is satisfied.	second higher harmonic			
	Minimize the second higher harmonic level. Spec 1. A≥45dB (METAL) Spec 2. A≥40dB (OXDIE)			

11-5-17. C Modulator Secondary Distortion Adjustment

[Connection]



Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	TP207/MDM-3P(A-4)	⊘ RV211/MDM-3P(A-4)
CAMERA IN: flat field 3 signal		
• Insert a BCT-20M cassette tape.	A	
• EE mode		
After the adjustment, insert a BCT-20K cassette tape and		
check that the Spec 2. is satisfied.	second higher harmonic	
	Minimize the second higher harmonic level.	
	Spec 1. A≥45 dB (METAL) Spec 2. A≥35 dB (OXDIE)	

11-5-18 EE DUB Y Output Level Adjustment

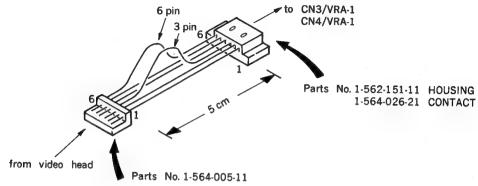
Machine conditions for adjustment	Specifications	Adjustments		
· VIDEO SW: CAMERA	TP306/MDM-3P(F-4)	⊘ RV112/MDM-3P(C-2)		
CAMERA IN: 75% color bar signal EE mode	A=1±0.01V			
	TRIG: TP101/MDM-3P(B-3)			

11-5-19. EE DUB CTDM Output Level Adjustment

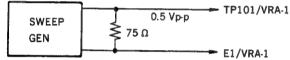
Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	TP406/MDM-3P(D-4)	⊘ RV212/MDM-3P(C-2)
CAMERA IN: 75% color bar signal EE mode		
	A=0.78±0.01V	
	TRIG: TP101/MDM-3P(B-3)	

11-6. VRA BOARD ALIGNMENT

• When VRA board alignment of S/N 10770 and higher, Prepare the extension harness for adjustment as follows;

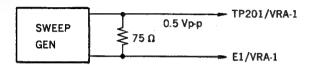


11-6-1. Y REC Current Frequency Response Adjustment (METAL)



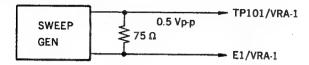
	FT\ AUV-T			
Machine conditions for adjustment	Spec	ifications		Adjustments
• Remove CN1 and CN3 on the	CH-A: Pin 3 of CN3/VR	A-1		CH-A:
VRA-1 Board.	CH-B: Pin 6 of CN3/VR	A-1		Ø RV107/VRA-1
				CH-B:
· VIDEO SW: CAMERA				ØRV109/VRA-1
· CAMERA IN: color bar signal				
CAMERA IIV. COIOT DAT SIGNAT				
· Connect the SWEEP GEN				
described above, and supply				
the RF sweep signal.		10 MHz		
	2 MHz			
· Connect the locally special			ļ	
made extension harness				
between the CN3 and harness.	frequency	level	ן [
· Connect the current probe to	2MHz	100% reference		
the pin 3 or pin 6 of the	10MHz			
extension harness.	TOMINZ	70%±20		
• Insert a BCT-20M cassette			!	
tape.				
• REC mode			ļ	
After the adjustment, mount				
the CN1 and CN3 on the		TRIG: TP44/S	SV-94P(J-1)	
VRA-1 Board.				

11-6-2. C REC Current Frequency Response Adjustment (METAL)



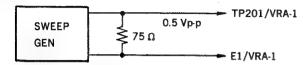
Machine conditions for adjustment	Specifications				Adjustments
· Remove CN1 and CN4 on the	CH-A: Pin 3 of CN4/VRA-1			CH-A:	
VRA-1 Board.	CH-B: Pin (6 of CN4/VR	A-1		⊘ RV207/VRA-1
					CH-B:
· VIDEO SW: CAMERA					ØRV209/VRA-1
CAMERA IN: color bar signal					
· Connect the SWEEP GEN		سلاا	10 MHz		
described above, and supply		2 MHz			
RF sweep signal.					
· Connect the locally special		frequency	level]	
made extension harness		2MHz	100% reference	1	
between the CN4 and harness.		10MHz	60%+20		
• Connect the current probe to				-	
the pin3 or pin6 of the					
extension harness.					
• Insert a BCT-20M cassette					
tape.					
• REC mode					
After the adjustment, mount					
CN1 and CN4 on the VRA-1					
Board.	TRIG: TP44/SV-94P(J-1)				

11-6-3. Y REC Current Frequency Response Adjustment (OXIDE)



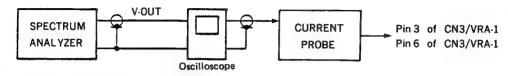
Machine conditions for adjustment	Specifications				Adjustments
Remove CN1 and CN3 on the	CH-A: Pin 3 of CN3/VRA-1				CH-A:
VRA-1 Board.	CH-B: Pin 6 of	CN3/VR	A-1		ØRV108/VRA-1
					CH-B:
· VIDEO SW: CAMERA					⊘ RV110/VRA-1
 CAMERA IN: color bar signal Connect the SWEEP GEN described above, and supply RF sweep signal. 		2 MHz	10 MHz		
· Connect the locally special	fre	quency	level		
made extension harness	2	MHz	100% reference		
between the CN3 and harness.	10	0MHz	70%+20		
Connect the current probe to the pin 3 or pin 6 of the extension harness.					
• Insert a BCT-20K cassette tape.					
• REC mode					
After the adjustment, mount				į	
CN1 and CN3 on the VRA-1					
Board.			TRIG: TP44/S	V-94P(J-1)	

11-6-4. C REC Current Frequency Response Adjustment (OXIDE)



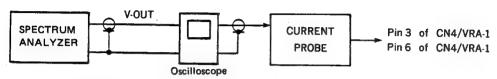
Machine conditions for adjustment	Specifications				Adjustments	
Disconnect CN1 and CN4 on the VRA-1 Board.		3 of CN4/VF 6 of CN4/VF			CH-A: ⊘ RV208/VRA-1	
· VIDEO SW: CAMERA					CH-B: ⊘ RV210/VRA-1	
• CAMERA IN: color bar signal	Λ					
 Connect the SWEEP GEN described above, and supply RF sweep signal. 		2 MHz	10 MHz			
· Connect the locally special		frequency	level			
made extension harness between the CN4 and harness.		2MHz	100% reference			
		10MHz	60%+20			
• Connect the current probe to						
the pin 3 or pin 6 of the extension harness.						
• Insert a BCT-20K cassette tape.						
• REC mode						
After the adjustment, connect						
CN1 and CN4 on the VRA-1 Board.			TRIG: TP44/	SV-94P(J-1)		

11-6-5. Y REC Amp Secondary Distortion Adjustment



Machine conditions for adjustment	Specifications	Adjustments
Remove CN3 on the VRA-I Board.	CH-A: Pin 3 of CN3/VRA-1 CH-B: Pin 6 of CN3/VRA-1	CH-A: ⊘ RV102/VRA-1 CH-B:
· VIDEO SW: CAMERA		♥ RV104/VRA-1
CAMERA IN: flat field signal	A	
 Connect the locally special made extension harness 	<u> </u>	
between the CN3 and harness.	A=60±3mAp-p	
Connect the current probe to the pin 3 or pin 6 of the extension harness.	TRIG: TP408/MDM-3P(F-1)	
	spectrum analyzer	CH-A:
• Insert a BCT-20M cassette tape.		
• REC mode	reference secondary higher harmonic	
After the adjustment, mount CN3 on the VRA-1 Board.	Minimize the secondary higher harmonic level.	
CNS on the VKA-1 Board.	(B≩40 dB)	

11-6-6. C REC Amp Secondary Distortion Adjustment



Machine conditions for adjustment	Specifications	Adjustments
Remove CN4 on the VRA-1 Board.	CH-A: Pin 3 of CN4/VRA-1 CH-B: Pin 6 of CN4/VRA-1	CH-A: • RV202/VRA-1 CH-B:
· VIDEO SW: CAMERA		⊘ RV204/VRA-1
CAMERA IN: flat field signal	A	
 Connect the locally special made extension harness 		
between the CN4 and harness.	A=70±10mAp-p	
 Connect the current probe to the pin 3 or pin 6 of the extension harness. 	TRIG: TP408/MDM-3P(F-1)	
Insert a BCT-20M cassette tape.	spectrum analyzer	CH-A: © RV205/VRA-1
• REC mode	reference secondary higher harmonic	CH-B: ⊘ RV206/VRA-1
After the adjustment, mount CN4 on the VRA-1 Board.	Minimize the secondary higher harmonic level. (B≧40 dB)	

11-6-7. Y REC Current Adjustment (METAL)

Machine conditions for adjustment	Specifications	Adjustments	
Step 1. • VIDEO SW: CAMERA • CAMERA Y IN: flat field 1 signal	TP301/MDM-3P(F-3)	CH-A:	
Insert a BCT-20M cassette tape.		·	
• REC mode	Maximize the amplitude A and B.		
•	TRIG: TP308/MDM-3P(F-3)		
Step 2. • Play back the self recorded portion on the BCT-20M cassette tape.	Cceck: $A=B=0.5\pm0.1\ V$ (The voltage difference between CH-A and CH-B should be within 0.1V)		
Maximize the RF level with the TRACKING control VR.			
	TRIG: TP308/MDM-3P(F-3)		
Step 3. • Remove CN3 on the VRA-1 Board.	CH-A: Pin 3 of CN3/VRA-1 CH-B: Pin 6 of CN3/VRA-1		
VIDEO SW: CAMERA CAMERA Y IN: flat field 1 signal	A		
DOT COM	A=60±10mAp-p		
 Insert a BCT-20M cassette tape. 	Check the recording current value at the current probe on pin 3 and pin 6 of CN3.		
• REC mode			
 Connect the locally special made extension harness between the CN3 and harness. 			
 Connect the current probe to the pin 3 or pin 6 of the extension harness. 	· .	· · · · · · · · · · · · · · · · · · ·	
After the adjustment, mount CN3 on the VRA-1 Board.			

11-6-8. Y REC Current Adjustment (OXIDE)

Machine conditions for adjustment	Specifications	Adjustments
Step 1. • VIDEO SW: CAMERA	TP301/MDM-3P(F-3) A B	CH-A: ② RV101/VRA-1 CH-B:
• CAMERA Y IN: flat field 1		⊘ RV103/VRA-1
• Insert a BCT-20K cassette tape.		į
• REC mode	Maximize the amplitude of A and B. TRIG: TP308/MDM-3P(F-3)	
Step 2. • Remove CN3 on the VRA-1 Board.		
 Connect the locally special made extension harness between the CN3 and harness. 		
 Connect the current probe to the pin 3 or pin 6 of the extension harness. 	Adjust the recording current YA+5 mA YB+5 mA	
 Mesure the recording current value on pin 3 of CN3/VRA-1 (YA) and pin 6 of CN3/VRA-1 (YB). 		
Step 3. Play back the self recorded portion on the BCT-20K cas-	Check: A=B=0.6±0.1 Vp-p (The voltage difference between	
sette tape.	CH-A and CH-B should be within 0.1V)	
• Maximize the RF level with the TRACKING control VR.	TRIG: TP308/MDM-3P(F-3)	
Step 4. • VIDEO SW: CAMERA	CH-A: Pin 3 of CN3/VRA-1 CH-B: Pin 6 of CN3/VRA-1	
• CAMERA Y IN: flat field 1		
• Insert a BCT-20M cassette tape.	A=43±8 mAp-p	
• REC mode	Check the recording current value at the current probe on pin 3 and pin 6 of CN3.	
• After the adjustment, mount CN3 on the VRA-1 Board.		

Machine conditions for adjustment	Specifications	Adjustments	
Step 1. • VIDEO SW: CAMERA	TP401/MDM-3P(D-3) A B	CH-A: ⊘ RV202/VRA-1 CH-B:	
CAMERA C IN: flat field 3		⊘ RV204/VRA-1	
 Insert a BCT-20M cassette tape. 			
• REC mode	Maximize the amplitude of A and B. TRIG: TP408/MDM-3P(F-1)		
Step 2.			
• Remove CN4 on the VRA-1 Board.			
 Connect the locally special made extension harness between the CN4 and harness. 	Adjust the recording current		
 Connect the current probe to the pin 3 or pin 6 of the extension harness. 	CA – 20 mA CB – 20 mA		
 Mesure the recording current value on pin 3 of CN4/VRA-1 (CA) and pin 6 of CN4/VRA-1 (CB). 			
Step 3.			
· Play back the self recorded	Check: A=B=0.55±0.1 Vp-p		
portion on the BCT-20M cas- sette tape.	(The voltage difference between CH-A and CH-B should be within 0.1V)		
Maximize the RF level with the TRACKING control VR.	TRIG: TP408/MDM-3P(F-1)		
Step 4.	CH-A: Pin 3 of CN4/VRA-1		
· VIDEO SW: CAMERA	CH-B: Pin 6 of CN4/VRA-1		
• CAMERA Y IN: flat field 3			
 Insert a BCT-20M cassette tape. 	A		
• REC mode	A=50±7 mAp-p		
After the adjustment, mount CN4 on the VRA-1 Board.	Check the recording current value at the current probe on pin 3 and pin 6 of CN4.		

11-6-10. C REC Current Adjustment (OXIDE)

Machine conditions for adjustment	Specifications	Adjustments
Step 1. • VIDEO SW: CAMERA • CAMERA C IN: flat field 3 • Insert a BCT-20K cassette tape. • REC mode	Maximize the amplitude of A and B. TRIG: TP408/MDM-3P(F-1)	CH-A: ORV201/VRA-1 CH-B: ORV203/VRA-1
Step 2. • Play back the self recorded portion on the BCT-20K cassette tape.	Check: A=B=0.65±0.1 Vp-p (The voltage difference between CH-A and CH-B should be within 0.1V)	
Minimize the RF level with the TRACKING control VR.	TRIG: TP408/MDM-3P(F-1)	
Step 3. • Remove CN4 on the VRA-1	CH-A: Pin 3° of CN4/VRA-1 CH-B: Pin 6 of CN4/VRA-1	
VIDEO SW: CAMERA CAMERA C IN: flat field 3	A	
• Insert a BCT-20K cassette tape.	A=34±10 mAp-p Check the recording current value at the current probe	
• REC mode	on pin 3 and pin 6 of CN4.	
 Connect the locally special made extension harness between the CN4 and harness. 		
 Connect the current probe to the pin 3 or pin 6 of the extension harness. 		
After the adjustment, mount CN4 on the VRA-1 Board.		

11-6-11. Overall Y/C RF Balance/Level Adjustment

Step 1. Y/C RF BALANCE/LEVEL CHECK (METAL)

Machine conditions for adjustment	Specifications	Adjustments	
· VIDEO SW: CAMERA	[Y RF balance/level]		
	TP301/MDM-3P(F-3)		
• CAMERA IN: flat field 3			
larest a BOT COM according			
Insert a BCT-20M cassette			
tape, and put the unit into the self REC/PB mode.	CH-A CH-B		
TRACKING: Maximize the RF			
ievel	Spec 1. CH-A=CH-B=0.50±0.1 V		
	Spec 2. The voltage difference between CH-A and		
	CH-B should be within 0.05 V.		
	TRIG: TP308/MDM-3P(F-3)		
	[C RF balance/level]		
	TP401/MDM-3P(D-3)		
	CH-A CH-B		
	Spec 1. CH-A=CH-B=0.5±0.1 V		
	Spec 2. The voltage difference between CH-A and		
	CH-B should be within 0,05 V.		
	TRIG: TP408/MDM-3P(F-1)		

^{* 1.} When the specification in the Step 1. is not satisfied, perform section 11-6-7 and 11-6-9 within the specification.

Step 2. Y/C RF BALANCE/LEVEL CHECK (OXIDE)

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	[Y RF balance/level]	
• CAMERA IN: flat field 3	TP301/MDM-3P(F-3)	
Insert a BCT-20K cassette tape, and put the unit into the self REC/PB mode.	CH-A CH-B	
TRACKING: Maximize the RF		
level	Spec 1. CH-A=CH-B=0.5±0.1 V	
	Spec 2. The voltage difference between CH-A and CH-B should be within 0.1V	
	TRIG: TP308/MDM-3P(F-3)	
	[C RF balance/level] TP401/MDM-3P(D-3)	
	CH-A CH-B	
	Spec 1. CH-A=CH-B=0.5±0.1 V Spec 2. The voltfge difference between CH-A and	
	CH-B should be within 0.1 V.	
	TRIG: TP408/MDM-3P(F-1)	

^{* 2.} When the specification in Step 2. is not satisfied, perform section 11-6-8 and 11-6-10 within the specification.

11-6-12. Overall Y Frequency Response Check

Machine conditions for adjustment		Specifications		
Set the S1 on the ENC-11P	TP132/ENC-11P	(H-2)		
Board (C-1) to the ON position. • VIDEO SW: CAMERA		0.5 1 2 4 5	5.5MHz	
CAMERA IN: multi-burst signal	'		1	
	• METAL	• OXIDE		
Insert a BCT-20M cassette	Frequency	Level Frequency	Level	
tape, and put the unit into the self-REC/PB mode.	0.5MHz 100%	Reference 0.5MHz	100%Reference	
Sell-REO/FB filode.	1 MHz 10	00 ⁺⁵ ₋₁₀ % 1 MHz	100±5%	
After the adjustment, insert a	2 MHz 10	00 ⁺⁵ ₁₀ % 2 MHz	100±50%	
BCT-20K cassette tape, and	4 MHz 10	00 ⁺⁵ ₁₀ % 3 MHz	85±10%	
put the unit into the self-REC/	5 MHz 10	00±5,% 4 MHz	80+57%	
PB mode.	5.5MHz 9	0+5/6		

[•] When the specification is not satisfied, perform 11-6-14. Overall Y/C Frequency Response Adjustment.

11-6-13. Overall C Frequency Response Check

Machine conditions for adjustment	Specific	ations	Adjus
Set S1 on the ENC-11P Board	TP2/CEC-3P(F-2)	•	
C-1) to the ON position.	_		
/IDEO SW: CAMERA		5 1 1.5MHz	
AMERA IN: multi-burst signal			
sert a BCT-20M cassette			
pe, and put the unit into the	• METAL	• OXIDE	
elf-REC/PB mode.	Frequency Level	Frequency Level	
Stay the adjustment incert a	0.2MHz 100% Reference	0.2MHz 100%Reference	
After the adjustment, insert a BCT-20K cassette tape and	0.5MHz 100±5%	0.5MHz 100±5%	
out the unit into the self-REC/	1 MHz 100 ⁺¹⁰ %	1 MHz 95±10%	
PB mode.	1.5MHz 90 ⁺¹⁰ / ₁₅ %	1.5MHz 90 ⁺¹⁵ / ₁₅ %	

[•] When the specification is not satisfied, perform section 11-6-14. Overall Y/C Frequency Response Adjustment.

11-6-14. Overall Y/C Frequency Response Adjustment

When performing this step, refer to the sections as follows.

11-6-1, 11-6-3. Y REC Current Frequency Response Adjustment (METAL)(OXIDE)

11-6-2, 11-6-4. C REC Current Frequency Response Adjustment (METAL)(OXIDE)

Perform adjustment for both Y and C.

Machine conditions for adjustment	Chaoitiantiana	
• When Y frequency response adjustment This is same as section 11-6-1 and 11-6-3.	[When the high-frequency level is high in 11-6-12, 13.] • Y adjustment CH-A: Pin 3 of CN3/VRA-1 CH-B: Pin 6 of CN3/VRA-1	• Y adjustment (METAL) CH-A: ORV107/VRA-1 CH-B: ORV109/VRA-1
	CH-A: Pin 3 of CN4/VRA-1 CH-B: Pin 6 of CN4/VRA-1 Z MHz 10 MHz Raise the 10 MHz level. [When the high-frequency level is low in 11-6-12, 13.] Y adjustment CH-A: Pin 3 of CN3/VRA-1 CH-B: Pin 6 of CN3/VRA-1 CH-A: Pin 3 of CN4/VRA-1 CH-B: Pin 6 of CN4/VRA-1 CH-B: Pin 6 of CN4/VRA-1	• Y adjustment (OXIDE) CH-A:
	2 MHz 10 MHz Lower the 10 MHz level.	

After the adjustment, perform check item in the following adjustment.

11-6-7. Y REC Current Adjustment (METAL)

11-6-8. Y REC Current Adjustment (OXIDE)

11-6-9. C REC Current Adjustment (METAL)

11-6-10. C REC Current Adjustment (OXIDE)

11-6-15. CONFI Output Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Connect pin 14 of CN1 on the MDM-3P Board (D-4) to GND with a shorting clip.	Step 1. VIDEO OUT Connector (terminated at 75ohms)	⊘ RV1(IC505)/MDM-3P(E-1)
· CONFI SW: Y		
Play back the color bar (DO) signal on the alignment tape CR5-1B PS.	A=1.0±0.1 V	
	TRIG: TP308/MDM-3P(F-3)	
	Step 2. VIDEO OUT connector (terminated at 75 ohms)	⊘ RV2(IC505)/MDM-3P(E-1)
	DO portion Coincide DO portion with the 3 rd step.	
	* Repeat Step 1. and 2 until the value satisfy the specification.	
	TRIG: TP308/MDM-3(F-3)	
· CNFI SW: C	Step 3. VIDEO OUT Connector (terminated at 75ohms)	
After the adjustment, remove the shorting clips.		
Set the CONFI SW to OFF.	A=0.5±0.1V	

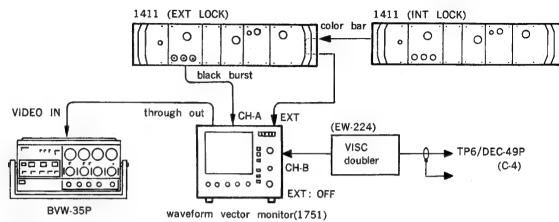
11-7. VIDEO OVERALL PHASE ADJUSTMENT

11-7-1. VISC Adjustment

Step 1.

Machine conditions for adjustment	Specifications	Adjustments	
• Turn RV507 on the DEC-49P Board (E-2) fully clockwise direction.	TP9/DEC-30(C-4)	Spec 1. ② RV509/DEC-49P(E-2) Spec 2. ② RV507/DEC-49P(E-2)	
• Set RV508 on the DEC-49P Board (E-2) to the mechanical center position.			
VIDEO IN: black burst signal	Spec 1: $A = 0.35 \pm 0.01 V$ Spec 2: $B = 0.3 \pm 0.01 V$		
• EE mode			
 waveform vector monitor: WFM mode (line selector 8 line) 			

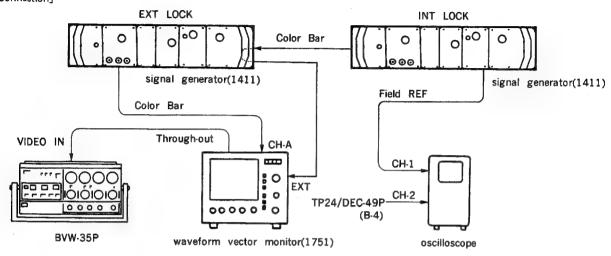
Step 2.
[Connection]



Machine conditions for adjustment	Specifications	Adjustments
VIDEO IN: black burst signal	waveform vector monitor	
Set SCH phase to zero degree with the SC PHASE control knob on the signal generator.	0° [vector mode]	

11-7-2. VISC Mute Adjustment

Machine conditions for adjustment		
VIDEO IN: color bar signal EE mode waveform monitor: WFM mode (line selector 8 line)	VIDEO OUT connector (terminated at 75ohms) 7 8 9 A→0	RV401/ENC-11P(E-1)



Step 1.

Machine conditions for adjustment	Specifications	Adjustments	
VIDEO Level: center clicked position	Waveform vector monitor +90°	SC PHANE control knob on the signal generator	
• VIDEO IN: color bar signal			
• EE mode			
• Set the SCH phase to the O-degree position with the SC PHASE control knob on the	0.		
EXT LOCK 1411.			
	-90° [SCH mode]		

Step 2.

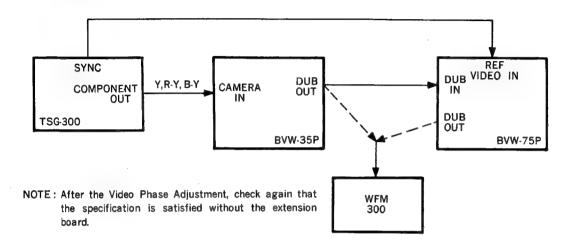
Machine conditions for adjustment	Specifications	Adjustments
 Connect TP19 on the DEC- 49P Board (A-2) to GND with a shorting clip. 		Ø RV610/DEC-49P(A-2)
• Turn temporarily RV610 on the DEC-49P Board (A-2) fully clockwise direction.	Field REF	
VIDEO level: Center clicked position	TP24/DEC-49P(B-4) OK:	
VIDEO IN: color bar signal	NG:	
• EE mode		
 Adjust the field signal with an oscilloscope. 		
After the adjustment, remove the shorting clip.	TRIG: SG Field F	REF

Step 3.

Machine conditions for adjustment	Specifications	ifications Adjustments	
 Turn the SC PHASE control knob on the signal generator, and shift the phase by ± 80 degrees. Check the specification in Step 2. VIDEO level: Center clicked position VIDEO IN: color bar signal EE mode 	Waveform vector monitor +90° -90° [SCH mode] When the specification in Step 2. is not satisfic readjust from Step 2.	SH PHASE control knob on the signal generator	

11-7-4. Video Phase Adjustment

[Connection]



Step 1. BVW-75P Check

Machine conditions for adjustment	Specifications	Adjustments
 Play back the bowtie & 10T signal on the alignment tape CR5-1B PS with a BVW-75P. 	DUB OUT connector/BVW-75P B-Y R-Y C/C delay 0±5 nsec Y/C delay 0±5 nsec	* When out of specification. C/C delay ◇ RV501/TBC-8P(F-1) : BVW-75P Y/C delay ◇ Y/C DELAY/sub panel : BVW-75P

Step 2. DUB OUT Y/C Delay Adjustment (EE mode)

Machine conditions for adjustment	Specifications	Adjustments	
· VIDEO SW: CAMERA	DUB OUT connector/WFM-300	●RV139/ENC-11P (G-2)	
• CAMERA IN: BOWTIE(50%) • EE mode	B-Y R-Y		
	Y/C delay 0±20 nsec		

11-7-5. PB C/C, Y/C Delay Adjustment

Machine conditions for adjustment		
Play back the bowtie & 10T signal on the alignment tape	DUB OUT connector/WFM-300	⊘ RV1/EQ-23 [A160] :
CR5-1B PS.	C/C delay	CEC-3P(E-2)
	B-Y R-Y Equalize amount of delay	
	0±10 nsec	
	Y/C delay	
	0±10 nsec	⊘ RV501/ENC-11P(C-1)

11-7-6. PB Y/C Delay Adjustment (Composite)

Machine conditions for adjustment	Spec	ifications	Adjustments
 Play back the Y/C delay portion on the alignment tape CR5-2A PS. 	VIDEO OUT connector OK OK	NG NG Y delay Y advance	⊘ RV507/CEC-3P(B-3)

11-7-7. Video Phase Adjustment (1)

Machine conditions for adjustment	Specifications	Adjustments
Play back the bowtie & 10T signal on the alignment tape CR5-1B PS with a BVW-75P.	DUB OUT connector/BVW-75P: WFM-300	SYNC FINE/sub panel : BVW-75P
CAPSTAN LOCK SW/sub panel (BVW-75P): 2FD	Coincide the mark in the center with center of the bowtie.	
	0±5 nsec	

11-7-8. Video Phase Adjustment (2)

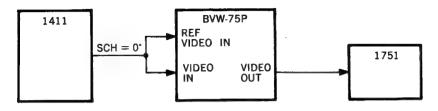
Machine conditions for adjustment	Specifications	Adjustments
VIDEO SW: CAMERA CAMERA IN: bowtie signal (50%)	DUB OUT connector/BVW-75P: WFM-300	Metal ②RV615/TG-31: MDM-3P(B-2) Oxide ②RV616/TG-31: MDM-3P(B-2)
Connect the DUB OUT connector on the BVW-35P to the DUB IN connector on the BVW-75P Insert a BCT-20M (in the Metal mode adjustment)/ BCT-20K (in the Oxide mode adjustment) cassette tape.	Coincide the mark in the center with center of the bowtie. 0±5 nsec	
• INPUT SELECT SW/BVW-75P: CTDM		
• EE mode (Both BVW-35P, and BVW- 75P)		

11-7-9. Overall C/C, Y/C Delay Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Step. 1		
· VIDEO SW: CAMERA		Metal ORV1/EQ-23 [A109]
• CAMERA IN: bowtie signal (50 %)	B-Y R-Y	: CEC-3P(F-2)
 Connect the DUB OUT connector on the BVW-35P to the DUB IN connector on the BVW-75P. 		
 Insert a BCT-20M (in the Metal mode adjustment)/BCT- 20K (in the Oxide mode adjustment). 	Equalize amount of the delay 0±20 nsec	
• INPUT SELECT SW/BVW-75P: CTDM		Metal ⊘ RV617/MDM-3P Oxide
• EE mode (Both BVW-35P and BVW-75P)		ØRV618/MDM-3P
	Coincide the mark in the center with center of the bowtie.	
	0±20 nsec	
Step. 2		
· VIDEO SW: CAMERA	DUB OUT connector/BVW-35P: WFM-300	
CAMERA IN: bowtie signal (50 %) Insert a BCT-20M/BCT-20K cassette tape.	Check that the specification in step 1 is satisfied. When the specification is not satisfied, readjust in step 1 within the specified level.	
 Play back the self recorded portion. 		
Step. 3	·	
 Play back the recorded cassette tape in step 2 with a BVW-75P. 	DUB OUT connector/BVW-75P: WFM-300 Check that the specification in step 1 is satisfied. When the specification is not satisfied, readjust in	
	step 1 within the specified level.	

11-7-10. VISC Check (1)

[Connection]



BVW-75 VISC Check and adjustment

VIDEO IN/BVW-75P: color bar signal INPUT SELECT SW/BVW-75P: COMPOSITE CAPSTAN LOCK SW/BVW-75P: 2FD/(4FD) (sub paneul) S500-4/TBC-8 (H-1) BVW-75P: ON After the adjustment, set S500-4 to the OFF position. Set SCH to zero degree *1751 LINE SELECT=8LINE VIDEO OUT connector/BVW-75P ORV510/CF-28: DEC (E-8): ORV510/CF-28: DEC (E-8): ORV701/EN-48(I-2-75P) CAPSTAN LOCK=8	Machine conditions for adjustment	Specifications	Adjustments
COMPOSITE CAPSTAN LOCK SW/BVW-75P: 2FD/(4FD) (sub paneul) S500-4/TBC-8 (H-1) BVW-75P: ON After the adjustment, set S500-4 to the OFF position. Set SCH to zero degree * 1751 LINE SELECT=8LINE VIDEO OUT connector/BVW-75P BURST O' BURST O' CAPSTAN LOCK=8: ORY701/EN-48(I-275P) CAPSTAN LOCK=8: ORY701/EN-48(I-275P)		VIDEO OUT connector/BVW-75P	SC/sub panel: BVW-75P
75P: 2FD/(4FD) (sub paneul) S500-4/TBC-8 (H-1) BVW-75P: ON After the adjustment, set S500-4 to the OFF position. Set SCH to zero degree * 1751 LINE SELECT=8LINE VIDEO OUT connector/BVW-75P BURST 90' CAPSTAN LOCK=8 ©RY701/EN-48(I-275P)		90*	
- S500-4/TBC-8 (H-1) BVW-75P: ON - After the adjustment, set S500-4 to the OFF position. Set SCH to zero degree * 1751 LINE SELECT=8LINE VIDEO OUT connector/BVW-75P BURST O' BURST O' CAPSTAN LOCK=81 ©RV701/EN-48(I-2 75P	75P:	BURST	
Set SCH to zero degree * 1751 LINE SELECT=8LINE VIDEO OUT connector/BVW-75P BURST O' BURST O' VISC CAPSTAN LOCK=81 ©RV701/EN-48(I-2 75P		/\	
VIDEO OUT connector/BVW-75P BURST O' VISC RV510/CF-28: DEC (E-8): CAPSTAN LOCK=81 ORV701/EN-48(I-2 75P		Set SCH to zero degree	
90° CAPSTAN LOCK=8 ©RV701/EN-48(I-275P)		* 1751 LINE SELECT=8LINE	
CAPSTAN LOCK=8			
		BURST	CAPSTAN LOCK=8FD ◆RV701/EN-48(I-2): BVW 75P
Coincide the burst with the VISC phase.		VISC	
* 1751: VECTOR mode		Coincide the burst with the VISC phase.	

11-7-11. VISC Check (2)

Machine conditions for adjustment	Specifications	Adjustments
VIDEO IN: Pulse/Bar composite signal	VIDEO OUT connector/BVW-75P	
• Insert a BCT-20M cassette tape.	OK OK NG NG	
• REC mode	Y delay Y advance	
Play back the recorded portion with a BVW-75P	1 delay 1 advance	
• CAPSTAN LOCK/BVW-75P: 8 FD	(0±20 nsec)	
	* When the specification is not satisfied, perform section 11-7-1 again.	

11-7-12. Overall Y/C Delay Adjustment (METAL)

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	VIDEO OUT connector (terminated at 75ohms)	
 CAMERA IN: pulse/bar signal Insert a BCT-20M cassette tape, and put the unit into the self-REC/PB mode. 	OK	
	NG	
	chroma advance	
	Turn RV617 slightly counterclockwise direction.	
	NG Chroma delay	
	Turn RV617 slightly clockwise direction.	
· Waveform monitor:	Spec 1.	
LINE SELECTOR OFF	0±20nsec	
· Waveform monitor:	Spec 2. Difference between fields	
LINE SELECTOR 15 LINE	0±30 nsec	
Field: 1+3, 2+4	CH-A: 1+3, CH-B: 2+4	

11-7-13. Overall Y/C Delay Adjustment (OXIDE)

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	VIDEO OUT connector (terminated at 75 ohms)	⊘ RV618/TG-31[A102](B-2)
• CAMERA IN: pulse/bar signal		
· Insert a BCT-20K cassette	ок / \	
tape, and put the unit into the		
self REC/PB mode.		
	NG	
	chroma advance	
	Turn RV618 slightly counterclockwise direction.	
	NG	
	Turn RV618 slightly clockwise direction.	
Waverform monitor:	Spec 1.	-
LINE SELECTOR OFF	0±20 nsec	
Waveform monitor:	Spec 2. Difference between fields	
LINE SELECTOR 15 LINE	0±30 nsec	
Field: 1+3, 2+4	CH-A: 1+3, CH-B: 2+4	

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SONY

PORTABLE VIDEOCASSETTE RECORDER

BVW-35P

SUPPLEMENT-4

Applicable Serial No.: 10425 through 10769

Applicable Manual: 2nd Edition.

CONTENTS: Section 8. POWER SUPPLY AND SYSTEM CONTROL ALIGNMENT

Section 9. SERVO SYSTEM ALIGNMENT Section 10. AUDIO SYSTEM ALIGNMENT Section 11. VIDEO SYSTEM ALIGNMENT

Please file this SUPPLEMENT-4 to your own manual, and replace the TABLE OF CONTENTS with attached ones.

BETACAM SP

MAINTENANCE MANUAL Volume 1

EBU N-10 LEVEL

BVW-35P (EK) 9-967-120-04 Sony Corporation
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- 12. BLOCK DIAGRAMS
- 13. SEMICONDUCTOR ELECTRODES
- 14. SCHEMATIC DIAGRAMS
- 15. PRINTED WIRING BOARDS
- 16. SPARE PARTS AND FIXTURE

SECTION 8 POWER SUPPLY AND SYSTEM CONTROL ALIGNMENT

[Equipment Required]

- Oscilloscope
- · Blank tape (BCT-20K or the equivalent)
- · Variable voltage power supply
- DC voltmeter
- PAL signal generator (TEKTRONIX 1411 or equivalent)

8-1. POWER SUPPLY CHECK

Be sure to perform the following check when repairing or replacing a DC-DC converter.

8-1-1. DC-DC Converter Voltage Check

Machine conditions for adjustment	Specifications	Adjustments
· EE mode	TP1/MB-157(G-1)	
	+12.0±0.2 V	
DC voltmeter	TP2/MB-157(D-2)	
	+9.2±0.2 V	
	TP3/MB-157(B-5)	
	+5.1±0.2 V	
	TP4/MB-157(B-4)	
	−5.15±0.2 V	
	TP5/MB-157(G-1)	
	-12.05±0.2 V	

8-2. SYSTEM CONTROL ALIGNMENT

8-2-1. Battery Before/End Voltage Adjustment

Machine conditions for adjustment	Specifications	Adjustments
SAVE, PB/EE, PB select sw: SAVE (on the connector panel)	TP21/SY-110(C-1)	©RV1/SY-110(J-1) Turn RV1 counterclockwise
Turn RV1 on the SY-110 Board (J-1) fully clockwise direction.	-10μsec	direction little by little, and adjust to the point that the negative pulse is generated.
EXT DC IN: 10.540±0.005 V (from variable voltage power supply)	A	
POWER SW: ON	A≒16 msec	

8-2-2. Battery Meter Calibration Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO IN: color bar signal	AUDIO CH-2/TRACK/BATT meter	⊘ RV13/MT-34 (F-1)
• Supply 11.00±0.01 Vdc voltage to the battery terminal.	20 10 5 3 0 VIDEO	
Insert a BCT-20 K cassette	BATT	
tape.		
• REC mode		
• Put the unit vertically.		
• Meter select sw: BATT	Make a slight gap between the pointer and green belt. (within a pointer width)	

SECTION 9 SERVO SYSTEM ALIGNMENT

[Equipment Required]

- · Square-wave oscillator
- DC voltmeter
- · Dual-trace oscilloscope
- Frequency counter
- Monitor
- · Shorting clip
- PB amplifier jig (J-6331-120-A)
- Blank tape (BCT-20K)
- Alignment tape CR2-1BPS (8-960-096-51)

Contents

VIDEO TRACK	AUDIO TRACK	TIME CODE TRACK	CTL TRACK
Y;6MHz signal C;5MHz signal	Blank	CTL	CTL

• Alignment tape CR5-1APS (8-960-098-37)

Contents

TIME min. sec	VIDEO TRACK	AUDIO TRACK	TIME CODE TRACK	CTL TRACK
0: 00 4: 55 —	Color Bars	Blank		
5: 00	Blank			
0. 55	Gated Sweep	1 kHz/O dB		;
8: 55 —— 9: 00 ——	Biank			
	Y/C Delay	10 kHz/-10 dB	EBU	
10: 55	Blank		Time Code	CTL
11: 00 12: 55 13: 00	2T Pulse & Bar Blank	1 k~15 kHz/-20 dB 1 kHz (reference)		
14: 55 ——— 15: 00 ———	C-Linearity Blank	40 7k 10k 15k		
16: 55	C-Monoscope (Switching position) is shifted.	Blank		
18: 55	Blank	Blank	Blank	800 Hz sin wave

[VIDEO IN]

· When performing the servo system alignment, supply standard video signal to the VIDEO IN.

9-1. FF/REW SPEED TENTATIVE ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
 Press the cassette-in switch without inserting a cassette tape and put the unit into the THREADING mode. 	TP6/SD-16P (E-1) 7.0±0.1 Vdc	⊘ RV23/SV-94P (K-2)
Place the unit prependecular to the floor.		
• REW mode		
• DC voltmeter		

9-2. FF REEL SEND CURRENT ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
 Press the cassette-in switch without inserting a cassette tape, and put the unit into the THREADING mode. 	Positive (+) side: TP9/SD-16P (G-2) Negative (-) side: TP10/SD-16P (D-2)	⊘ RV31/SV-94P (L-3)
	45±2 mVdc	
Place the unit prependecular to the floor.		
• Connect TP33 on the SV-94P		
Board (K-3) to GND with a		
shorting clip.		
•		
• Supply 800 Hz, 5 Vp-o square-		
wave signal to TP34 on the		
SV-94P Board (K-3).		
• FF mode		
• DC voltmeter		
After the adjustment, remove		
the shorting clip.		

9-3. REW REEL SEND CURRENT ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
• Press the cassette-in switch	Positive (+) side : TP8/SD-16P (G-2)	⊘ RV28/SV-94P (K-3)
without inserting a cassette tape, and put the unit into the THREADING mode.	Negative () side: TP5/SD-16P (D-2)	
THREADING Mode.	68±2 mVdc	
· Place the unit perpendicular to	08±2 mvqc	
the floor.		
• Connect TP31 on the SV-94P		
Board (K-3) to GND with a shorting clip.		
· Supply 800 Hz, 5 Vp-o square-		
wave signal to TP32 on the		
SV-94P Board (K-3).		
• REW mode		
• DC voltmeter		
After the adjustment, remove		
the shorting clip.		

9-4. imes 1/30 TOP REW ADJUSTMENT (AT THE TAKE-UP REEL)

Machine conditions for adjustment	Specifications	Adjustments
Set the pre-recorded BCT-20K cassette tape to its beginning portion, and then insert it.	Positive (+) side: TP8/SD-16P (G-2) Negative (-) side: TP5/SD-16P (D-2)	⊘ RV29/SV-94P (L-3)
• Put the unit into the REW- SEARCH mode. Three seconds later, connect TP50 on the	66±2 mVdc	
SV-94P Board (F-2) to GND	⟨Reference⟩	
with a shorting clip. Then,	When REW-SEARCH mode:	
put the unit into the REW-	66±5 mVdc	
SEARCH STILL mode.		
• DC voltmeter		
After the adjustment, remove the shorting clip.		

9-5. $\times 1/30$ TOP FF ADJUSTMENT (AT THE TAKE-UP REEL)

Machine conditions for adjustment	Specifications	Adjustments
Set the pre-recorded BCT-20K cassette tape to its beginning, and then insert it.	Positive (+) side: TP8/SD-16P (G-2) Negative (-) side: TP5/SD-16P (D-2)	⊘RV30/SV-94P (L-3)
Put the unit into the FF- SEARCH mode. Three seconds later, connect TP50 on the	264±2 mVdc	
SV-94P Board (F-2) to GND	<reference></reference>	
with a shorting clip. Then,	When FF-SEARCH mode:	
put the unit into the FF- SEARCH STILL mode.	264±10 mVdc	
• DC voltmeter		
After the adjustment, remove the shorting clip.		

9-6. $\times 1/30$ TOP FF ADJUSTMENT (AT THE SUPPLY REEL)

Machine conditions for adjustment	Specifications	Adjustments
• Set the pre-recorded BCT-20K	Positive (+) side : TP9/SD-16P (G-2)	⊘RV33/SV-94P (L-2)
cassette tape to its beginning portion, and insert it.	Negative (-) side: TP10/SD-16P (F-1)	
• Put the unit into the FF- SEARCH mode. Three seconds later, connect TP50 on the	286±2 mVdc	
SV-94P Board (F-2) to GND	<reference></reference>	
with a shorting clip. Then,	When FF-SEARCH mode:	
put the unit into the FF- SEARCH STILL mode.	110 ₋₁₀ mVdc	
• DC voltmeter		
After the adjustment, remove		
the shorting clip.		

9-7. imes 1/30 TOP REW ADJUSTMENT (AT THE SUPPLY REEL)

Machine conditions for adjustment	Specifications	Adjustments
 Set the pre-recorded BCT-20K cassette tape to its beginning portion, and insert it. 	Positive (+) side: TP9/SD-16P (G-2) Negative (-) side: TP10/SD-16P (F-1)	⊘ RV34/SV-94P (L-2)
• Put the unit into the REW- SEARCH mode. Three seconds later, connect TP50 on the	198±2 mVdc	
SV-94P Board (F-2) to GND	<reference></reference>	
with a shorting clip. Then,	When REW-SEARCH mode:	
put the unit into the REW- SEARCH STILL mode.	285 ±16 mVdc	
• DC voltmeter		
After the adjustment, remove the shorting clip.		

9-8. SEARCH ×3 CURRENT ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
Set the pre-recorded BCT-20K cassette tape to its beginning portion, and insert it.	Positive (+) side: TP9/SD-16P (G-2) Negative (-) side: TP10/SD-16P (F-1)	ØRV32/SV-94P (L-3)
• REW-SEARCH mode	440±2 mVdc	
• DC voltmeter	⟨Reference⟩ When inserting a pre-recorded BCT-20K cassette tape which is set to its end portion: 285 ±½ mVdc	

9-9. BACK TENSION ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
 Set the pre-recorded BCT-20K cassette tape to its beginning portion, and insert it. 	Positive (+) side: TP11/SD-16P (E-1) Negative (-) side: TP12/SD-16P (E-1)	⊘ RV35/SV-94P (L-2)
• FF-SEARCH mode	1080±10 mVdc	
• DC voltmeter	<pre><reference> When inserting a pre-recorded BCT-20K cassette tape which is set to its end portion:</reference></pre>	

9-10. DRUM PG ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
 Press the cassette-in switch without inserting a cassette tape, and put the unit into the THREADING mode. 	CH-1: TP45/SV-94P (B-3) CH-2: TP5/SV-94P (B-3)	⊘ RV1/SV-94P (B-2)
• PLAY mode	TP45	
	A=25 mV±25 mV (Reference) When connecting TP16 on the SV-94P Board (F-3) to GND with a shorting clip:	
	A=25 mV±25 mV	

9-11. CAPSTAN FG-B ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
 Press the cassette-in switch without inserting a cassette tape, and put the unit into the 	CH-1: TP22/SV-94P (G-2) CH-2: (TRIG): TP401/SV-94P (G-2)	⊘ RV15/SV-94P (G-2)
THREADING mode. • PLAY mode		
	A B	
	A = B	

9-12. CAPSTAN FREE SPEED TENTATIVE ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
Insert the alignment tape CR5-1A PS. PLAY mode	TP20/SV-94P (A-1) Duty cycle $\left(\frac{B}{A}\right) = 30\pm2\%$	●RV21/SV-94P (B-1)

9-13. STOP SERVO ADJUSTMENT

Step 1

Machine conditions for adjustment	Specifications	Adjustments
• Connect TP24 on the SV-94P (J-1) Board to TP26 on the SV-94P (K-1) with a shorting clip.	TP28/SV-94P (J-1)	ØRV18/SV-94P (J-2)
Play back color bar signal on the alignment tape CR5-1A PS.	A=0	
 After the adjustment, remove the shorting clip. 		

Specifications

Step 3

Machine conditions for adjustment	Specifications	Adjustments
• Connect TP25 on the SV-94P (J-1) Board to TP27 on the SV-94P Board (K-2) with a shorting clip.	TP41/SV-94P (H-1)	●RV19/SV-94P (J-2)
 Play back color bar signal on the alignment tape CR5-1A PS. 	A = 0.6±0.05 Vdc	
• PLAY•PAUSE mode		
After the adjustment, remove the shorting clip.		

9-14. TRACKING CENTER TENTATIVE ADJUSTMENT

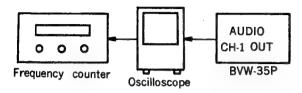
Machine conditions for adjustment	Specifications	Adjustments
Set the TRACKING control volume to the center clicked	CH-1: TP17/SV-94P (G-1) CH-2: TP21/SV-94P (E-2)	⊘ RV14/SV-94P (F-2)
position.		Adjust center of the jitter.
 Insert the alignment tape CR2-1B PS. 	TP17	
• PLAY mode	TP21	
	TP17 —	
	TP21	
	A	
	$A = 6.7 \pm 0.1 \text{ ms}$	

9-15. 1/2VD PB CTL ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
• Connect TP16 on the SV-94P Board (F-3) to GND with a shorting clip.	CH-1: TP44/SV-94P (J-1) CH-2: TP21/SV-94P (E-2)	●RV21/SV-94P (B-1)
Insert the alignment tape CR2-1B PS.		
• PLAY mode	TP21 —	
 After the adjustment, remove the shorting clip. 		
	A=0±100μsec	

9-16. TAPE SPEED ADJUSTMENT

[Connection]



Machine conditions for adjustment	Specifications	Adjustments
• Connect as follows with shorting clips:	AUDIO OUT CH-1 connector	
TP21/SY-110 (C-1) \longleftrightarrow GND		
TP30/SV-94P (B-1) ←→ GND	tape speed=1000±1 Hz	Adjust output level according to the correction value.
· Insert the alignment tape		
CR5-1A PS.		
Play back from 5:00 to 9:		
OO on the alignment tape		
CR5-1A PS.		
· After the adjustment, remove		
the shorting clips.		

9-17. FF/REW SPEED ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
Insert the Alignment tape CR5-1A PS.	TP17/SV-94P (G-1)	⊘ RV23/SV-94P (K-2)
REW mode (from 15:00 to 5:00 on the alignment tape CR51A PS).	2.66 msec±0.05 msec	

9-18. DRUM LOCK PHASE/P2 PHASE ADJUSTMENT

Step 1

Machine conditions for adjustment	Specifications	Adjustments
Connect TP7/SV-94P (C-4) to GND with a shorting clip.	CH-1: TP42/SV-94P (B-3) CH-2: TP48/SV-94P (A-1)	⊘ RV7/SV-94P (E-2)
· VIDEO IN: color bar signal		
• Insert a BCT-20K cassette tape.	TP42	
• REC mode		
After the adjustment, remove the shorting clip.	TP48	
	A=143 \pm 9.5 μ sec (2.25 \pm 0.15H)	

Step 2

Machine conditions for adjustment	Specifications	Adjustments
VIDEO IN: color bar signal Insert a BCT-20K cassette	CH-1: TP42/SV-94P (B-3) CH-2: TP48/SV-94P (A-1)	⊘ RV4/SV-94P (B-3)
tape. • REC mode	TP42	
	TP48	
	A=value in step $1\pm6.3\mu sec$ (0.1H)	

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO IN: color bar signal	TP12/SV-94P (E-1)	
• TBC SW: OFF	2.5±0.5 Vdc	
Connect VIDEO OUT 1 to the monitor.	TP11/SV-94P (E-1) voltage value in TP12±0.5 Vdc	
• Play back color bar signal on		
the alignment tape CR5-1A PS.		

Step 2

Machine conditions for adjustment	Specifications	Adjustments
Set RV37 on the SV-94P Board (E-2) to the mechanical center position. Play back color bar signal on the alignment tape CR5-1A PS. STILL mode	Time difference A between PLAY and STILL modes ≤ 0.1 μsec * The monitor should be locked.	RV10/SV-94P (F-1) • Adjust center of the jitter.

Step 3

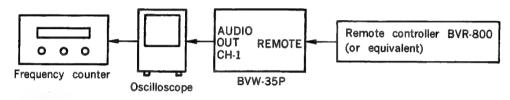
Machine conditions for adjustment	Specifications	Adjustments
Play back color bar signal on the alignment tape CR5-1A PS.	CN11 (6 pin)/SV-94P (E-1)	⊘ RV37/SV-94P (E-2)
• REW-SEARCH mode	1.85±0.02 Vdc	

Step 4 Check

Machine conditions for adjustment	Specifications	Adjustments
Play back color bar signal on the alignment tape CR5-1A	TP13/SV-94P (E-1)	
PS.	Voltage difference between PLAY mode and STILL mode ≤ 0.3 Vdc	
• PLAY mode and STILL mode		

9-20. SEARCH X1/30 ADJUSTMENT

[Connection]



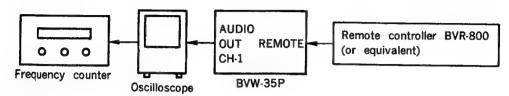
[Preparation]

- CH-1 AUDIO IN: 3000±1 Hz −60 dBs
- Insert a BCT-20K cassette tape, and record above signal.
 *Recording pear the middle of the tape is also possible (approximately pear the middle of the tape is also possible (approximately pear the middle of the tape is also possible (approximately pear the middle of the tape is also possible (approximately pear the middle of the tape is also possible (approximately pear the middle of the tape).
 - *Recording near the middle of the tape is also possible. (approximately five minutes)

Machine conditions for adjustment	Specifications	Adjustments
Put the unit into the remote controller's FWD SEARCH ×1/30 mode near the middle of the tape.	AUDIO OUT CH-1 connector	◆RV16/SV-94P (F-2)
Set the (3 kHz) recorded BCT-20K cassette tape to near its middle portion.	100.0±2 Hz	
Remote controller BVR-800 (or the equivalent)		
Frequency counter		

9-21. SEARCH X1 ADJUSTMENT

[Connection]



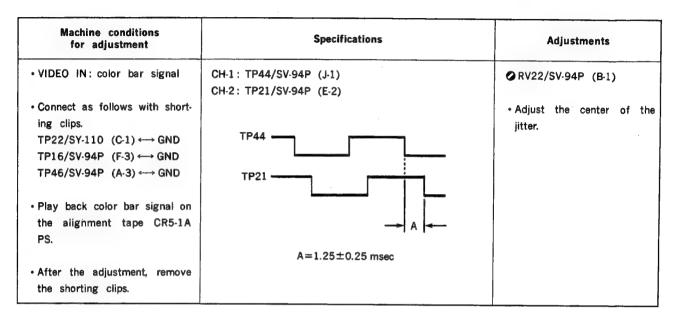
[Preparation]

- CH-1 AUDIO IN: 3000±1 kHz -60 dBs
- · Insert a BCT-20K cassette tape, and then record above signal.
 - *Recording near the middle of the tape is also possible (approximately five minutes).

Machine conditions for adjustment	Specifications	Adjustments
Put the unit into the remote controller's FWD-SEARCH ×1 mode near the middle of the	AUDIO OUT CH-1 connector	⊘ RV17/SV-94P (F-2)
tape.	2950±10 Hz	
Set the (3 kHz) recorded	<reference> .</reference>	
BCT-20K cassette tape to its middle.	When FWD-SEARCH ×1/30 mode. 100±5 Hz	
Remote controller (BVR-800 or the equivalent)	When FWD-SEARCH ×5 mode. 8700±500 Hz	

9-22. QUICK START ADJUSTMENT

Step 1

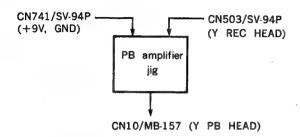


Step 2 Check

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO IN: color bar signal	CH-1: TP44/SV-94P (J-1)	
	CH-2: TP21/SV-94P (E-2)	
• Insert a BCT-20K cassette		
tape.	TP44	
• REC mode		
· Press the PAUSE button five		
times each two seconds.	TP21	
Play back the recorded por-		
tion.	→ B -	
	A≦0.5 msec	
	B≦1.0 msec	
	•	
	*When specification is not satisfied, perform readjust-	
	ment within the spec. in the step1.	

9-23. RECORDING PICTURE SPLIT ADJUSTMENT

[Connection]



Machine conditions for adjustment	Specifications	Adjustments	
Connect a monitor to the VIDEO OUT connector.	monitor picture splitting point		
 Connect the PB amplifier jig. Connect TP16 on the SV-94P Board (F-3) to GND with a shorting clip. S1/ENC-6P: ON 			
 Play back C-monoscope signal on the alignment tape CR5-1A PS. 	picture split A≦1:μsec		
Put the monitor into the H-DELAY mode.	If the specification is not satisfied, perform adjustment as follows:		
After the state of	Step 1 Check the picture splitting point. Step 2 Set RV12 to the mechanical center position.		
 After the adjustment, set S1 on the ENC-6P Board to OFF again, and then remove the shorting clip. 	Step 3 Adjust the picture splitting point to the former position with RV11. Step 4 Minimize the picture split A with RV12.		

9-24. V JITTER ADJUSTMENT IN THE STILL MODE

Machine conditions for adjustment	Specifications	Adjustments	
Connect a monitor to the VIDEO OUT connector.	monitor	⊘ RV36/SV-94P (C-3)	
 Play back C-monoscope signal on the alignment tape CR5-1A PS. PLAY · PAUSE mode 	0		
	Minimize the V jitter		

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SECTION 10 AUDIO SYSTEM ALIGNMENT

[Required equipment]

- · Audio oscillator
- · Audio attenuator
- · AC voltmeter
- · Spectrum analyzer
- · Dual-trace oscilloscope
- Alignment Tape CR5-1A PS (8-960-098-37)

• Alignment tape CR5-1B PS (8-960-096-91)

Contents

		· · · · · · · · · · · · · · · · · · ·
TIME min. sec	VIDEO TRACK	AUDIO TRACK
0: 00	Color Bars	Blank
4: 55	Blank	1
5: 00 —		
	Gated Sweep	1 kHz/0 dB*1
8: 55	Blank	1
9: 00	Y/C Delay	10 kHz/-10 dB
10: 55	Blank	1
11:00 —	D.G.III.	
10.55	2T Pulse & Bar	1 k~15 kHz/-20 dB*2 1 kHz (reference)
12: 55 ——	Blank	1
13: 00	C-Linearity	40 7 k 10 k
	Blank	15 k
15: 00		
	C-Monoscope Switching position is shifted.	Blank
16: 55		
18: 55	Blank	Blank

Notes:

* 1. When this tape is reproduced in the audio reference level check or adjustment, the output level (0 dB) should be corrected according to the correction value below.

Example) Correction value = $-0.5 \, dB$ Output level = $0 \, dB - 0.5 \, dB$ =

 $-0.5 \, dB$

* 2. The audio signal frequencies are recorded 30 seconds at a time, and it is repeated two times. When this tape is reproduced in the audio frequency response check or adjustment, the output level should be corrected according to the correction value.

Contents

TIME min. sec	VIDEO TRACK	AFM
0: 00	V.Locked Sweep	
2: 00		
	Gated Sweep (CTDM)	
5: 00		
	Pulse & Bar (CTDM)	Non-modulation
8: 00		
	Gated Sweep	
11: 00		
	Pulse & Bar	
14: 00		
44.00		400 Hz SINE WAVE 25 kHz DEVIATION
16: 30 ——	Color Bars (100%)	75 kHz DEVIATION
17: 00 —	Bowtie & 10T	
19: 00		
	Line 17 Signal	
22: 00	C Linearity	
24: 00	-	Non-modulation
26: 00	Flat Field (CTDM)	
	Color Bars with Dropout	
28: 00	Color Multi Pulse	
30:00	with VISC	

Contents

TIME min. sec	AUDIO TRACK	VIDEO TRACK	CTL TRACK
00: 00	1 kHz OVU	Black Burst	CTL
02: 30			
	Blank (only Bias)	Black Burst	CTL
03: 00 ——	15144 0001		
05: 00	15 kHz OVU	Black Burst	CTL
00.00	1 kHz -20VU	Black Burst	CTL
06: 00			<u> </u>
	40 Hz -20VU		
	7 kHz -20VU	Black Burst C	071
	10 kHz -20VU		CTL
	15 kHz -20VU		
08: 00			
10: 00	1 kHz OVU		1 kHz Sine Wave

[NOTE]

When replacing the VRs described below, be sure to turn the VRs fully counterclockwise direction from viewing the component side.

Alignment Tape CR8-1B PS (8-960-096-86)

RV1 on the HP-36 Board RV1 on the VR-63 Board

[Switch Setting]

Fro	nt	nar	ler
	111	vai	161

CH-1 AUDIO REC level switch

: MANUAL

CH-2 AUDIO REC level switch

: MANUAL

METER select switch

: AUDIO

· Connector Panel

CAMERA/LINE select switch

: LINE (CH-1 to CH-4)

AUDIO IN level select switch

: +4dB (CH-1 to CH-4)

AFM INPUT switch

: CH-3/CH-4

EE select switch

: NORMAL

CH-4 OUT switch

: CH-4

CH-1 +48V switch

: OFF

AUDIO NR switch

: OFF

MONITOR select swich

: OFF (CH-1 to CH-4)

CONFI switch

: Y AUDIO

VIDEO IN select switch

: LINE

TBC switch

. LINE

DUB switch

: OFF

202 30100

: CH-2

These switches and volume controls should not be touched unless otherwise specified.

[Blank Tape]

The "Blank Tape" described in the adjustment item indicates the cassette tape on which no video and audio signals are recorded.

When performing the audio system alignment, extend the AU-93P Board with an extension board (EX-150 Board).

When performing Longitudinal Audio system alignment, set S1 on the AU-93P Board (E-3) to the LV102 side. After alignment, set S1 to the former position. Check that the S2 on the AU-93P Board (C-1) is set to the CH-1 side.

10-1. EE LEVEL ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
• EE mode	EE mode CH-1: TP102/AU-93P (F-4) CH-2: TP202/AU-93P (F-4)	
- AUDIO IN CH-1/CH-2:1 kHz, +4 dBs AUDIO IN CH-3/CH-4: 400Hz, +4 dBs	−10±0.1 dBs	front panel
	CH-3: pin 1 of the NR-19 Board/AU-93P (C-2) CH-4: pin 10 of the NR-19 Board/AU-93P (C-2)	CH-3/CH-4: CH-3, CH-4 REC VRs on the front panel
	$-19.5\pm0.1~\mathrm{dBs}$ Note: Be careful not to touch the REC VRs which have been adjusted.	

10-2. LIMITER OPERATION LEVEL ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
• Set the CH-1/CH-2 AUDIO IN level select switch to -60 dB.	AUDIO OUT CH-1 connector (at 600-ohm load) AUDIO OUT CH-2 connector (at 600-ohm load)	◆ CH-1: RV101/AU-93P (D-3) ◆ CH-2: RV201/AU-93P (C-3)
• EE mode		
• AUDIO IN CH-1/CH-2: 1kHz, —30 dBs	+15±0.2 dBm	
• After the adjustment, set the CH-1/CH-2 AUDIO IN level select switch to +4 dB.		

10-3. LEVEL METER CALIBRATION ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
• EE mode	Audio level meter (CH-1 to CH-4)	O CH-1: RV5/MT-34 (A-1)
	10 5 3 0	OCH-2: RV6/MT-34 (C-1)
· AUDIO IN (CH-1 to CH-4):	20]]]	⊘ CH-3: RV7/MT-34 (D-1)
1 kHz, +4 dBs	- +	⊘ CH-4: RV8/MT-34 (E-1)
METER select switch: AUDIO	//	
	VU	
	The pointer reading should be zero.	
Put the unit upright and place		
the meter at horizontal level.	⟨Reference⟩	
	When putting the unit upright and placing the meter at the vertical level.	

10-4. PB FREQUENCY RESPONSE ADJUSTMENT

Step 1. PB Frequency Response Check

Machine conditions for adjustment		Specification	95	Adjustments
 Play back 1 kHz, 7 kHz, 10 kHz and 15 kHz signals on the alignment tape CR5-1A 	1	T CH-1 connector (at	600-ohm load)	• 7 kHz Adjustment
PS.	1 kHz 7 kHz 10 kHz	CH-1 Reference Reference±0,3dB Reference±0,5dB	CH-2 Reference Reference±0.3 dB Reference±0.5 dB	• 10 kHz and 15 kHz Adjust ment OCH-1: RV304/AU-93P (D-1
	to t	Reference±0.7 dB n audio level should b he correction value. ecification is not sati		⊘ CH-2: RV354/AU-93P (D-1

Step 2. In case the high-frequency level is lower than the specified value.

Machine conditions for adjustment	Specifications	Adjustments
 Play back 1 kHz, 7 kHz, 10 kHz and 15 kHz signals on the aligniment tape CR5-1A 	Solder-bridge slots SL301 and SL351 and perform Step 1.	
PS.	When the specification is not satisfied: Solder-bridge slots SL302 and SL352 and perform Step 1.	
	When the specification is not satisfied: Solder-bridge slots SL303 and SL353 and perform Step 1.	

10-5. PB LEVEL ADJUSTMENT

Step 1.

Machine conditions for adjustment	Specifications	Adjustments
• Play back 1 kHz, 0 VU signals	CH-1: TP102/AU-93P (F-4)	◆CH-1: RV303/AU-93P (D-3)
on the alignment tape CR8-1B PS	CH-2: TP202/AU-93P (F-4)	◆CH-2: RV353/AU-93P (C-3)
	−10±0.2 dBs	

Step 2.

Machine conditions for adjustment	Specifications	Adjustments
 Play back 1 kHz, 0 VU signals on the alignment tape CR8-1B PS. 	AUDIO OUT CH-1 connector (at 600-ohm load) AUDIO OUT CH-2 connector (at 600-ohm load)	◆ CH-1: CH-1 PB VR ◆ CH-2: CH-2 PB VR (on the front panel)
	+4±0.3 dBm	
	Note: Be careful not to touch the PB VRs which have been adjusted.	

10-6. FULL ERASE CURRENT ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
Insert a BCT-20M cassette tape.	TP851/AU-93P (G-1)	⊘ RV851/AU-93P (H-2)
• REC mode	308 ± 0 mVrms	

10-7. DUB ERASE CURRENT ADJUSTMENT

*After the DUB Erase Current Adjustment, the CH-1 and CH-2 DUB phases should coincide with the signal phase at TP852.

If not, finely adjust them with LV901 and LV951. (Be sure to change the phase in the channel with higher level).

10-7-1. CH-1 DUB Erase Current Adjustment

Machine conditions for adjustment	Specifications	Adjustments
• AUDIO IN CH-1/CH-2: No signal	Step1. TP852/AU-93P (F-1) 130±1 kHz	⊘RV801/AU-93P (G-4)
• Insert a recorded BCT-20M	Step2.	
cassette tape on which signals have been recorded.	TP902/AU-93P (F-1) (TRIG): TP852/AU-93P (H-4)	⊘ LV901/AU-93P (G-1) ⊘ CP902/AU-93P (G-2)
· CH-1 DUB mode		
	Maximize the level.	
	*Adjustment should be performed within the range where the signal phase is locked.	
	Step3. TP902/AU-93P (F-1)	⊘RV903/AU-93P (F-2)
	440 ⁺⁰ ₋₉₀ mVrms	

10-7-2. CH-2 DUB Erase Current Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· AUDIO IN CH-1/CH-2: No	Step1.	
signal	TP952/AU-93P (G-1)	ØLV951/AU-93P (G-1)
	(TRIG): TP852/AU-93P (H-4)	●CP952/AU-93P (G-2)
 Insert a recorded BCT-20M cassette tape on which signals have been recorded. 	Maximize the level.	
• CH-2 DUB mode	*Adjustment should be performed within the range where the signal phase is locked.	
	Step2. TP952/AU-93P (G-1)	⊘ RV953/AU-93P (G-2)
	440 ⁺⁰ ₋₉₀ mVrms	

10-8. BIAS CURRENT PRELIMINARY ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
AUDIO IN (CH-1 to CH-4): No signals	CH-1 : TP303/AU-93P (D-1) (GND) : TP304/AU-93P (D-1)	
• Insert a BCT-20M cassette - tape.	CH-2 : TP353/AU-93P (D-1) (GND) : TP354/AU-93P (C-1)	
• REC mode	(TRIG): TP852/AU-93P (H-4) * Check that signal waveform at TP is locked to TRIG, and proceed to the next adjustment.	
	Step1.	◆ CH-1: CP901/AU-93P (G-3) ◆ CH-2: CP951/AU-93P (G-3)
	MM^	·
	A = MAX	
	Step2. $A = 15 \pm 2 mVrms$	◆ CH-1: RV901/AU-93P (G-3) ◆ CH-2: RV951/AU-93P (H-3)

10-9. REC BIAS TRAP ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
Insert a BCT-20M cassette	CH-1 : TP302/AU-93P (E-2)	OCH-1: LV301/AU-93P (E-2)
tape.	CH-2 : TP352/AU-93P (F-1)	OCH-2: LV351/AU-93P (E-1)
	(TRIG): TP852/AU-93P (H-4)	
• REC mode		
	Minimize the bias leak. (≤10 dBs)	
· AUDIO IN CH-1/CH-2: No		
signals	* Check that the leak bias is locked to TRIG.	

10-10. BIAS CURRENT ADJUSTMENT (METAL)

Step 1. CH-1 Adjustment

Machine conditions for adjustment	Specifications	Adjustments
CH-1 AUDIO IN: 1kHz, +4dBs CH-4 OUT SW: MON CH-1 MONITOR SELECT SW: ON Insert a BCT-20M cassette tape. REC mode	AUDIO OUT CH-4 connector (at 600-ohm load) A≒(maximum level)−2dB	♥ RV901/AU-93P(G-3) Turn RV901 gradually clockwise direction.
• Turn RV901 on the AU-93P Board(G-3) fully counter clockwise direction temporarily.	CH-1: TP303/AU-93P(D-1) (GND): TP304/AU-93P(D-1) C B	⊘ RV901/AU-93P(G-3)
• After the adjustment CH-4 OUT SW: CH-4 CH-1 MONITOR SELECT SW: OFF	① B≥18 mVrms C=15±0.2 mVrms ② B≤18 mVrms C=B-3±0.2 mVrms *The signal waveform at TP should be locked to the	
	TRIG: TP852/AU-93P(H-4)	

Step 2. CH-2 Adjustment

Machine conditions for adjustment	Specifications	Adjustments
• CH-2 AUDIO IN: 1kHz, +4dBs	AUDIO OUT CH-4 connector (at 600-ohm load)	⊘ RV951/AU-93P(H-3)
CH-4 OUT SW: MON CH-2 MONITOR SELECT SW: ON Insert a BCT-20M cassette tape.	A≒(maximum level)−2dB	
• REC mode	,	
 Turn RV951 on the AU-93P Board (H-3) fully counter- clockwise direction temporarily. 	CH-1: TP353/AU-93P(D-1) (GND): TP354/AU-93P(C-1) C B	⊘ RV951/AU-93P(H-3)
	① B≥18 mVrms C=15±0.2 mVrms	
	② B≤18 mVrms C=B-3±0.2 mVrms	
• After the adjustment, CH-4 OUT SW: CH-4 CH-2 MONITOR SELECT	*The signal waveform at TP should be locked to the TRIG.	
SW: OFF	TRIG: TP852/AU-93P(H-4)	

10-11. BIAS CURRENT ADJUSTMENT (OXIDE)

Machine conditions for adjustment	Specifications	Adjustments
· AUDIO IN CH-1/CH-2: No	CH-1 : TP303/AU-93P (D-1)	♦ CH-1: RV902/AU-93P (G-3)
signals	(GND) : TP304/AU-93P (D-1)	OCH-2: RV952/AU-93₽ (G-3)
• Insert a BCT-20K cassette	CH-2 : TP353/AU-93P (D-1)	
tape.	(GND) : TP354/AU-93P (C-1)	
• REC mode	(TRIG) : TP852/AU-93P (H-4)	
	11±0.2 mVrms	
	* When the adjustment value is less than 11 mVrms. Value ± 0.2 mVrms	
	Note: The signal phase should be locked.	

10-12. DUB BIAS TRAP ADJUSTMENT

Step 1. CH-1 Adjustment

Machine conditions for adjustment	Specifications	Adjustments
• AUDIO IN: No signals	CH-1: TP305/AU-93P (D-3)	◆ CH-1: LV302/AU-93P (D-2)
 Insert a BCT-20M cassette tape on which signals have been recorded. 	Minimize the level.	
• CH-2 DUB mode		

Step 2. CH-2 Adjustment

Machine conditions for adjustment	Specifications	Adjustments
• AUDIO IN: No signais	CH-2: TP355/AU-93P (C-3)	⊘ CH-2: LV352/AU-93P (C-2)
 Insert a BCT-20M cassette tape on which signals have been recorded. 	Minimize the level.	
• CH-1 DUB mode		

10-13. OVERALL FREQUENCY RESPONSE ADJUSTMENT (OXIDE)

Machine conditions for adjustment		Specifications		Adjustments
• AUDIO IN CH-1/CH-2: 40, 1 k, 10 k, 15 k (Hz), -16dBs		connector (at 600-ohm	,	• 10 kHz and 15kHz signal portion © CH-1: RV1/AR-12P (F-2)
• Insert a BCT-20K cassette	Frequency	Specification		[A2]
ta pe.	40Hz	Reference±3dB		○CH-2: RV1/AR-12P (F-2) [A3]
_	1kHz	Reference	1	[73]
• Play back the self-recorded	10kHz	Reference±0.5dB		• 15 kHz signal portion only
ta pe.	15kHz	Reference±0.5dB		OCH-1: LV101/AU-93P (E-3)
	<u> </u>	<u> </u>		⊘ CH-2: LV201/AU-93P (F-3)

10-14. OVERALL PHASE ADJUSTMENT (OXIDE)

Machine conditions for adjustment	Specifications	Adjustments
Oscilloscope connection (in X-Y mode) CH-1: CH-1 AUDIO OUT connector	AUDIO OUT CH-1 connector (at 600-ohm load) AUDIO OUT CH-2 connector (at 600-ohm load)	◆RV2/AR-12P (F-2) [A2] (F-2) [A3]* Either A2 or A3.
CH-2: CH-2 AUDIO OUT conncetor		
• AUDIO IN CH-1/CH-2: 15 kHz, +4 dBs	(6 cm) Within 5°(0.5 cm)	
• Insert a BCT-20K cassette tape.	(6 cm)	
Play back the self-recorded tape.	ζο 5γ	

10-15. OVERALL LEVEL ADJUSTMENT (OXIDE)

Machine conditions for adjustment	Specifications	Adjustments
• AUDIO IN CH-1/CH-2: 1 kHz, +4dBs	CH-1: TP102/AU-93P (F-4) CH-2: TP202/AU-93P (F-4)	◆ CH-1: RV102/AU-93P (F-2) ◆ CH-2: RV202/AU-93P (F-1)
Insert a BCT-20K cassette tape.	−10±0.1 dBs	
• Play back the self-recorded tape.		

10-16. CONFI OUTPUT LEVEL ADJUSTMENT

Step 1. CH-1 Adjustment

Machine conditions for adjustment	Specifications	Adjustments
• AUDIO IN CH-1: 1kHz,+4dBs	AUDIO OUT CH-4 connector (at 600-ohm load)	ØRV1/C0-8
Insert a BCT-20K cassette tape.	+3±1 dBm	
• REC mode		
· CH-1 MONITOR select SW: ON		
· CH-4 OUT SW: MON		

Step 2. CH-2 Adjustment

Machine conditions for adjustment	Specifications	Adjustments	
• AUDIO IN CH-2: 1kHz,+4dBs	AUDIO OUT CH-4 connector (at 600-ohm load)	⊘ RV2/CO-8	
 Insert a BCT-20K cassette tape. 	+3±1 dBm		
• REC mode			
• CH-1 MONITOR select SW:			
CH-2 MONITOR select SW: ON			
· CH-4 OUT SW: MON			
 After the adjustment, return the CH-2 MONITOR select switch to OFF. 			

10-17. CONFI TC CANCEL ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
• AUDIO IN CH-1/CH-2: No signals	AUDIO OUT CH-4 connector (at 600-ohm load)	●RV702/AU-93P (C-1)
• Insert a BCT-20K® cassette tape.		
•REC mode		
• CH-1, 2 MONITOR select SW:	Minimize the level.	
· CH-4 OUT SW: MON		
• After the adjustment, return the CH-1/CH-2 MONITOR select switch to OFF and the CH-4 OUT switch to CH-4.		

10-18. INSERT CROSSTALK CANCEL ADJUSTMENT

Step 1. CH-1 Adjustment

Machine conditions for adjustment	Specifications	Adjustments	
• AUDIO IN CH-1: No signals AUDIO IN CH-2: 5 kHz, +4 dBs	AUDIO OUT CH-1 connector (at 600-ohm load) Minimize the crosstalk (5 kHz) in CH-2.	○ RV1/DC-33○ RV2/DC-33Alternately adjust.	
 Insert a BCT-20K cassette tape on which only CTL signals have been recorded. 	Note: The AUDIO OUT level difference between CH-1 and CH-2 should be 20dB or more.		
• CH-2 DUB mode			

Step 2. CH-2 Adjustment

Machine conditions for adjustment	Specifications	Adjustments	
• AUDIO IN CH-1: 5 kHz, +4dBs AUDIO IN CH-2: No signals	AUDIO OUT CH-2 connector (at 600-ohm load) Minimize the crosstalk (5 kHz) in CH-1.	○ RV3/DC-33○ RV4/DC-33Alternately adjust.	
 Insert a BCT-20K cassette tape on which only CTL signals have been recorded. CH-1 DUB mode 	Note: The AUDIO OUT level difference between CH-1 and CH-2 should be 20 dB or more.		

10-19. OVERALL FREQUENCY RESPONSE ADJUSTMENT (METAL)

Machine conditions for adjustment		Specifications	Adjustments
• S1/AU-93P: OFF • AUDIO IN CH-1/CH-2: 40, 1 k, 10 k, 15 k (Hz), -16 dBs		onnector (at 600-ohm onnector (at 600-ohm	• 10 kHz and 15kHz signal portion • CH-1: RV3/AR-12P (F-2) [A2] • CH-2: RV3/AR-12P (F-2)
Insert a BCT-20M cassette tape.	Frequency	Specification	[A3]
	40Hz	Reference±3dB	
· Play back the self-recorded	1kHz	Reference	• 15 kHz signal portion only
tape.	10kHz	Reference±0.5dB	OCH-1: LV102/AU-93P (E-3)
	15kHz	Reference±0.5dB	OCH-2: LV202/AU-93P (F-3)

10-20. OVERALL PHASE ADJUSTMENT (METAL)

Machine conditions for adjustment	Specifications	Adjustments
Oscilloscope connection (in X-Y mode)	AUDIO OUT CH-1 connector (at 600-ohm load) AUDIO OUT CH-2 connector (at 600-ohm load)	⊘ RV4/AR-12P [A2] [A3]
CH-1: AUDIO OUT CH-1 con- nector		* Either A2 or A3.
CH-2: AUDIO OUT CH-2 con- nector		
• AUDIO IN CH-1/CH-2: 15 kHz, +4 dBs	(6 cm) Within 5'(0.5 cm)	
 Insert a BCT-20M cassette tape. 		
Play back the self-recorded tape.	(6 cm)	

10-21. OVERALL LEVEL ADJUSTMENT (METAL)

Machine conditions for adjustment	Specifications	Adjustments
· AUDIO IN CH-1/CH-2: 1kHz,	CH-1: TP102/AU-93P (F-4).	◆ CH-1: RV103/AU-93P (F-2)
+4 dBs	CH-2: TP202/AU-93P (F-4)	OCH-2: RV203/AU-93P (F-1)
	-10±0.3 dBs	
 Insert a BCT-20M cassette 	<reference></reference>	
ta pe.	AUDIO OUT CH-1 connector (at 600-ohm load)	
	AUDIO OUT CH-2 connector (at 600-ohm load)	
· Play back the self-recorded		
ta pe.	+4±1 dBm	

10-22. AFM LIMITER LEVEL ADJUSTMENT

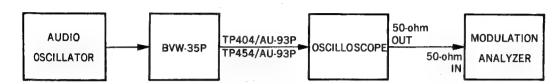
Machine conditions for adjustment	Specifications	Adjustments
• AUDIO IN CH-3/CH-4: 400Hz	CH-3: TP405/AU-93P (B-2)	◆CH-3: RV405/AU-93P (B-2)
	CH-4: TP455/AU-93P (B-2)	⊘ CH-4: RV455/AU-93P (B-3)
• LEVEL SELECT SW: -20 dB		
• Set pins 1 and 10 of the	positive side	
NR-19 Board to -19.5 dBs		
with the oscillator. Then, raise	\hat{A}	
the level by 20 dB.	/	
• EE mode	$\mathcal{Q} \setminus \mathcal{Q}$	
Out the OUTO/OUTA ANDIO IN	negative	
• Set the CH-3/CH-4 AUDIO IN	side	
level select SW to +4 dB	Adjust at point where the waveform distortion appears.	
again.		
	* When the waveform distortion of the positive side	
	appears at first, short SL502 on the AU-93P Board	
	(B-3).	

10-23. AFM CARRIER FREQUENCY ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
• AUDIO IN CH-3/CH-4: No signal	Step1 TP404/AU-93P (A-3)	Ø CH-3: RV404/AU-93P (A-4)
• EE mode	310±3 kHz	
	Step2 TP454/AU-93P (C-3)	⊘CH-4: RV454/AU-93P (C-4)
	540±3 kHz	

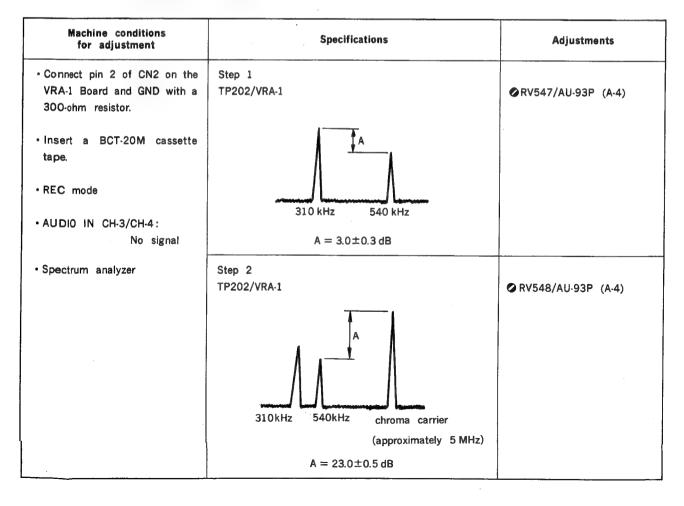
10-24. AFM DEVIATION ADJUSTMENT

[Connection]



Machine conditions for adjustment	Specifications	Adjustments
• AUDIO IN CH-3/CH-4: 400 Hz,	CH-3: TP404/AU-93P (A-3)	♥ CH-3: RV403/AU-93P (A-3
+4 dBs	CH-4: TP454/AU-93P (C-3)	⊘ CH-4: RV453/AU-93P (B-3
Insert a BCT-20M cassette tape.	25±0.2 kHz	
• REC mode		

10-25. AFM RECORDING CURRENT ADJUSTMENT



10-26. AFM PB RF LEVEL ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
• AUDIO IN CH-3/CH-4: No signal	TP502/AU-93P (A-3)	⊘ RV550/AU-93P (A-2)
 Play back the color bar signal on the alignment tape CR5-1B PS. 	A	
	$A = 2.0 \pm 0.1 \text{ Vp-p}$	

10-27. AFM PB LEVEL ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
· Play back the color bar signal	Step 1	
on the alignment tape CR5-1B	CH-3: TP402/AU-93P (B-2)	◆ CH-3: RV402/AU-93P (C-4)
PS.	CH-4: TP452/AU-93P (B-2)	◆ CH-4: RV452/AU-93P (B-4)
	-19.5±0.2dBs -19.5±0.2dBs	
	Step 2	
	AUDIO OUT CH-3 connector (terminated at 600 ohms).	Ø CH-3:
	AUDIO OUT CH-4 connector (terminated at 600 ohms)	Front panel: CH-3 PB VR
		⊘ CH-4:
	4±0.5 dBm	Front panel: CH-4 PB VR

10-28. AFM D.O.C. LEVEL ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
• AUDIO IN CH-3/CH-4: No signal	Pin 10 of IC503/AU-93P (A-1)	⊘ RV551/AU-93P (A-2)
 Playback the color bar signal on the alignment tape CR-5-1B PS. 	A	
	$A = 500 \pm 10 \text{ mVp-p}$	

10-29. AFM D.O.C. PULSE WIDTH ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
• AUDIO IN CH-3/CH-4: No signal	TP503/AU-93P (A-3)	●RV549/AU-93P (B-2)
 Play back the color bar signal on the alignment tape CR5-1B PS. 		
	$A = 12 \pm_{0}^{1} \mu \text{sec}$	

SECTION 11 VIDEO SYSTEM ALIGNMENT

[Equipment Required]

- · Dual trace oscilloscope
- · Frequency counter
- PAL signal generator (TEKTRONIX 1411 or equivalent)
- · Component signal generator (TEKTRONIX TSG-300 or equivalent)
- · Sweep generator
- Vectorscope
- · Waveform monitor
- · Component waveform monitor (TEKTRONIX WFM-300 or equivalent)
- · Waveform vector monitor (TEKTRONIX 1751 or equivalent)
- VISC doubler
- · Spectrum analyzer
- · Digital voltmeter
- · Shorting clip
- · Blank tape (BCT-20K or equivalent)
- · Blank tape (BCT-20M or equivalent)
- BETACAM (SONY BVW-75P or equivalent)
- · Alignment tape CR5-1A PS (8-960-098-37)

Contents

Contents			
TIME min. sec	VIDEO TRACK	AUDIO TRACK	
0: 00	Color Bars	Blank	
4: 55 —— 5: 00 ——	Blank		
	Gated Sweep	1 kHz/OdB*1	
8: 55	Blank	-	
9: 00 —	Y/C Delay	10 kHz/-10 dB	
10: 55	Blank	1	
11: 00	2T Pulse & Bar	1 k~15 kHz/-20dB*2 1k (reference)	
13: 00	Blank		
14: 55	C-Linearity	40 7k 10k	
15: 00	Blank	15k	
	C-Monoscope (Switching position is shifted.	Blank	
16: 55 —— 18: 55	Blank	Blank	

Alignment tape CR5-1B PS (8-960-096-91)

Contents

TIME min. sec	VIDEO TRACK	AFM
0: 00	V.Locked Sweep	
2: 00		-
	Gated Sweep (CTDM)	
5: 00		
	Pulse & Bar (CTDM)	Non-modulation
8: 00		
	Gated Sweep	
11: 00		1
	Puise & Bar	
14: 00		400 H- ONE WAVE
		400 Hz SINE WAVE 25 kHz DEVIATION
16: 30	Color Bars (100%)	75 kHz DEVIATION
17: 00	00101 Dars (100%)	75 KHZ DEVIATION
	Bowtie & 10T	
19: 00		
	Line 17 Signal	
22: 00		
	C Linearity	
24: 00		Non-modulation
26: 00	Flat Field (CTDM)	
	Color Bars	
28: 00	with Dropout	
28:00	Color Multi Pulse	
30:00	with VISC	

[Switch Setting]

Connector Panel

- EE SELECT SW; NORMAL
- · VIDEO SW; LINE
- · TBC SW; OFF
- · DUB SW; CH-2
- · CONFI SW; OFF
- TRACKING VR; center clicked position

These switches should not be touched unless otherwise specified.

All of the Video boards (CEC-3P, DEC-30, ENC-6P and MDM-3P) should be extended with an extension board (EX-150 Board).

11-1. MDM BOARD ALIGNMENT (PLAYBACK SYSTEM)

11-1-1. Y RF Balance/Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
 Play back the flat field signal on the alignment tape CR5-1B PS. Maximize the RF signal level with the TRACKING control knob. 	TP301/MDM-3P(F-4) Spec.1 A A=0.55±0.05 V Spec.2	 RV601/PA-60A[A301](F-4) RV602/PA-60A[A301](F-4)
	CH-A CH-B B=C TRIG: TP308/MDM-3P(F-3)	

11-1-2. Y AGC Adjustment

Machine conditions for adjustment	Specifications	Adjustments
 Set RV305 on the MDM-3P Board(G-4) to the mechanical center position. Play back the flat field signal on the alignment tape CR5-1B PS. 	A A A=0.5±0.05 V	⊘ RV603/RF-16A[A302](F-3)
	TRIG: TP308/MDM-3P(F-3)	

11-1-3. Y HF Input Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
 Play back the flat field signal on the alignment tape CR5-1B PS. 	TP303/MDM-3P(F-2) A A=0.10±0.01 V	⊘ RV607/EQ-14[A303](F-3)
	TRIG: TP308/MDM-3P(F-3)	
 Play back the flat field signal on the alignment tape CR5-1A PS. 	TP303/MDM-3P(F-2) A A=0.20±0.01 V	⊘ RV620/FL-66
	TRIG: TP308/MDM-3P(F-3)	

11-1-4. C RF Balance Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Play back the flat field signal	TP401/MDM-3P(D-3)	ØRV601/PA-60A[A401](E-4)
on the alignment tape CR5-1B PS.	Spec.1	◆RV602/PA-60A[A401](E-4)
	<u> </u>	
Maximize the RF level with the		
TRACKING control knob.		
	A=0.55±0.05 V	
	Spec.2	·
	В	
	c	
	CH-A CH-B	
	Unia Unia	
	B=C	·
	TRIG: TP408/MDM-3F	P(F-1)

11-1-5. C AGC Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Play back the flat field signal on the alignment tape CR5-1B PS.	TP402/MDM-3P(D-3)	⊘ RV603/RF·16A[A402](E·3)
	A=0.5±0.05 V	
	TRIG: TP408/MDM-3P(F-1)	

11-1-6. C HF Input Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Play back the flat field signal on the alignment tape CR5-1B PS.	A=0.2±0.01 V	⊘ RV607/EQ-14A[A403](E-3)
	TRIG: TP408/MDM-3P(F-1)	

11-1-7. Y Carrier Balance Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Play back the color bar signal on the alignment tape CR5-1A PS.	TP306/MDM-3P(F-4)	RV302/MDM-3P(F-2) RV608/DM-58[A304](G-1) Alternately adjust.
Step. 2 (Check) • Play back the gated sweep (CTDM) signal on the alignment tape CR5-1B PS.	TP306/MDM-3P(F-4) 100 % A 3MHz A≤10%	

11-1-8. C Carrier Balance Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Play back the color bar signal on the alignment tape CR5-1A PS.	TP406/MDM-3P(E-4)	 ◇RV402/MDM-3P(D-2) ◇RV608/DM-58[A404](A-1) • Alternately adjust.
Step. 2 (Check) • Play back the gated sweep (CTDM) signal on the alignment tape CR5-1B PS.	TP406/MDM-3P(E-4) 100 % 2.5MHz A≤10%	

11-1-9. Y Output Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
 Play back the color bar signal on the alignment tape CR5-1B PS. 	TP306/MDM-3P(F-4)	⊘ RV609/VA-54[A305](G-3)
 More than twenty seconds should elapse after the color bar signal is played back. 	~ ^ ^	
	A=1±0.01 V	

11-1-10. C Output Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
• Play back the color bar signal on the alignment tape CR5-1B PS.	TP406/MDM-3P(E-4) A=0.93±0.01V (Measure in the center of noise)	

11-1-11. Y D.O.C Sensitivity Adjustment

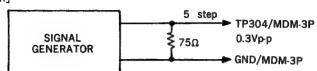
Machine conditions for adjustment	Specifications	Adjustments
 Play back the flat field signal on the alignment tape CR5-1B PS. Maximize the DC level with the TRACKING control knob. 	pin 2 of DO-19 [A307]/MDM-3P(E-3) V sync ENVELOPE dc level	
Step. 2 • PB PAUSE mode	CH-1: pin 2 of DO-19 [A307]/MDM-3P(E-3) CH-2: TP307/MDM-3P(F-4) pin 2 of	Metal:
Step. 3 • Check that no white noise appears near the guard band on a monitor.		
Play back the dropout check signal on the alignment tape CR5-1B PS.	Check that the dropout portion is compensated on the monitor.	

11-1-12. C D.O.C Sensitivity Adjustment

Machine conditions for adjustment	Specifications	Adjustments
 Play back the flat field signal on the alignment tape CR5-1B PS. 	pin 5 of DO-19 [A307]/MDM-3P(E-3) V sync	
 Maximize the DC level with the TRACKING control knob. 	ENVELOPE dc level	
Step. 2		
• PB PAUSE mode	CH-1: pin 5 of DO-19/MDM-3P(E-3) CH-2: TP407/MDM-3P(C-1) pin 5 of	⊘ RV624/DO-19[A307](E-2)
Step. 3		
 Check that no white noise appears near the guard band on a monitor. 		
Step. 4		
Play back the dropout check signal on the alignment tape CR5-IB PS.	Check that the dropout portion is compensated on the monitor.	

11-1-13. Y CCD Bias Adjustment

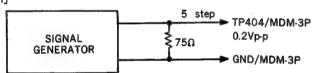
[Connection]



Machine conditions for adjustment	Specifications	Adjustments
Remove the solder bridge from	TP305/MDM-3P(G-4)	
SL1 on the MDM-3P Board(G-1). Supply 5-step signal to TP304 on the MDM-3P Board(G-1). Waveform moniter: DIFF'D STEP mode	100%	
PLAY mode (without inserting a cassette tape) After the adjustment, solder SL1 to the former position.	A ≤ 4% (Flat or the amplitude is decreased to the right)	

11-1-14. C CCD Bias Adjustment

[Connection]



Machine conditions for adjustment	Specifications	Adjustments
• Remove the SL2 on the MDM-3P Board(A-1).	TP405/MDM-3P(C-1)	⊘ RV610/DL-13[A406](D-2)
Supply 5-step signal to TP404 on the MDM-3P Board (A-1). Waveform monitor: DIFF'D STEP mode	100 %	
 PLAY mode (without inserting a cassette tape) After the adjustment, solder the SL2 to the former position. 	A≦4% (Flat or the amplitude is decreased to the right)	

11-1-15. Y D.O.C Replacement Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Play back dropout check signal on the alignment tape CR5-1B PS.	TP306/MDM-3P(F-4) 3rd step	Spec. 1
	Spec. 1 Adjust the sync tip level. Spec. 2 Adjust the 3rd step at the dropout portion. TRIG: TP44/SV-94P(J-1)	

11-1-16. C D.O.C Replacement Level Adjustment

Specifications	Adjustments
406/MDM-3P(E-4) pedestal level SYNC TIP	Spec. 1
Adjust the sync tip level oc. 2 Adjust the pedestal level	
:(Adjust the sync tip level

11-1-17. Y PB Frequency Response Adjustment (Metal)

Machine conditions for adjustment	Specifications	Adjustments	Adjustments	
Play back the gated sweep (CTDM) signal on the alignment tape CR5-1B PS.	TP306/MDM-3P(F-4) Spec. 1 0.5 0. 1	CH-A:		
	Frequency Level			
	0.5 MHz 100%(refe	rence)		
	1 MHz 100±5			
	2 MHz 100±5	%		
	3 MHz 100±5	%		
	4 MHz 100±5	%		
	5 MHz 100 ±89	%		
	Read in the center of Spec. 2 The difference between the CH-be within 5 % at 5MHz.			
	TRIG: T	FP308/MDM-3P(F-3)		
·	[NOTE] When the carrier balance is the CH-A and CH-B, perform carrier balance adjustment.			

11-1-18. Y Equalizer Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Play back the Pulse/bar (CTDM) signal on the align- ment tape CR5-1B PS.	TP306/MDM-3P(F-4) A = B	⊘ RV619/FL-66

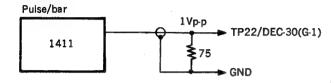
11-1-19. C PB Frequency Respose Adjustment (Metal)

Machine conditions for adjustment	Specifications	Adjustments
Play back the gated sweep	TP406/MDM-3P(E-4)	
(CTDM) signal on the align-	Spec. 1	CH-A:
ment tape CR5-1B PS.		
	0 0.5 1 2 3 M	IHz CH-B:
		PRV606/EQ-14A[A403](E-3)
	Frequency Level	
	0.5 MHz 100% (refer	ence)
	1 MHz 100±59	%
	2 MHz 100±5 9	%
	3 MHz 95±10	%
	Read in the center of	moire.
	Spec. 2	
	The difference between the CH-A	and CH-B should
	be within 5% at 3MHz.	
	TRIG: TF	P408/MDM-3P(F-1)

11-2. DEC BOARD ALIGNMENT

11-2-1. Y Noise Canceller Adjustment

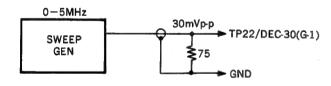
Machine conditions for adjustment	Specifications	Adjustments
 Play back the color bar signal on the alignment tape CR5-1B PS. 	TP22/DEC-30(G-1) A=1.0 +0.02 V	⊘ RV101/ENC-6P(G-4)
Step 2 • Play back the color bar signal on the alignment tape CR5-1B PS.	VIDEO OUT connector (terminated at 75 ohms) $A = 1.0 \pm 0.02 \text{ Vp-p}$	⊘ RV201/DEC-30(G-1)



Machine conditions for adjustment	Specifications	Adjustments
Insert the alignment tape CR5-1B PS, and then put the unit into the PB mode. Disconnect CN2 on the DEC-	TP25/DEC-30(G-1)	◆RV203/DEC-30(G-3)
30 Board.		
	Make flat the center of the noise.	

Step 4.

[Connection]



Machine conditions for adjustment	Specifications	Adjustments
Insert the alignment tape CR5-1B PS, and then put the unit into the PB mode.	TP23/DEC-30(G-1)	
• After the adjustment, connect CN2 on the DEC-30 Board.	Adjust as the above illustration.	

11-2-2. DEC Input Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
 Turn RV503 on the DEC-30 Board (F-2) fully counterclock- wise direction. 	TP1/DEC-30(E-4)	⊘ RV2/BF-29
Set the VIDEO LEVEL VR knob to the center clicked position.		
VIDEO IN: color bar signal		·
• EE mode	A=0.63±0.01 V	

11-2-3. Y Output Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Step. 1 • VIDEO IN: color bar signal (100-100-0) • EE mode	TP9/DEC-30(C-4)	⊘ RV504/DEC-30(E-2)
	A=1.00±0.01 V	
Step. 2	•	
• VIDEO SW: CAMERA	TP9/DEC-30(C-4)	⊘ RV508/DEC-30(C-4)
• CAMERA IN: color bar signal (100% White)		
• EE mode	A=1.00±0.01 V	

11-2-4. 4.5MHz Trap Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Turn RV503 on the DEC-30 Board (F-2) fully counterclock- wise direction.	TP9/DEC-30(C-4)	⊘ LV501/DEC-30(F-4)
VIDEO IN: H sweep signal		
• EE mode	4MHz 5MHz	
	A: B = 4:3±0.2	

11-2-5. Phase Equalizer Adjustment

Machine conditions for adjustment	Specifications	Adjustments
for adjustment • VIDEO IN: pulse/bar signal • EE mode	TP9/DEC-30(C-4)	● RV501/DEC-30(F-3) ● RV502/DEC-30(F-3)
	A -	
	Minimize the level. A=B	

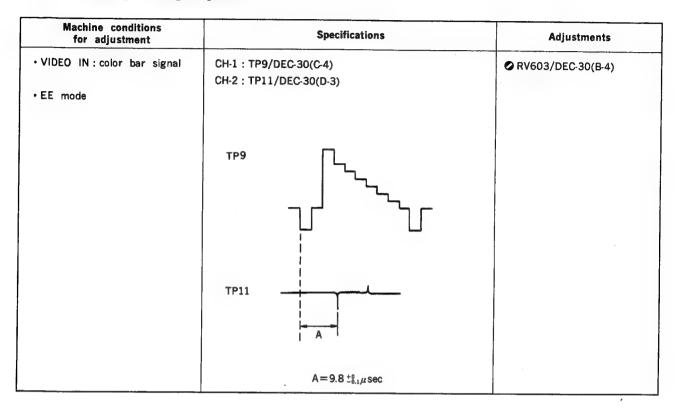
11-2-6. Chroma Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
• VIDEO IN: color bar signal (100-100-0)	TP6/DEC-30(G-1)	⊘ RV301/DEC-30(F-2)
• EE mode	A=1.00±0.01V	

11-2-7. Sampling Pulse Timing Adjustment

Machine conditions for adjustment	Specifications .	Adjustments
• VIDEO IN: color bar signal	CH-1: TP9/DEC-30(C-4) CH-2: TP16/DEC-30(B-2)	ØRV604/DEC-30(B-4)
• EE mode	CH-2. TP10/DEC-30(B-2)	
	TP9	
	TP16	
	$A=6.0\pm^{+0.1}_{-0}\mu$ sec	
	TRIG: TP1/DEC-30(E-4)	

11-2-8. Blanking Timing Adjustment



11-2-9. DEC HUE Adjustment

Machine conditions for adjustment	Specifications	Adjustments
• VIDEO IN : color bar signal (100-100-0)	CH-1: TP11/DEC-30(D-3) CH-2: TP13/DEC-30(D-3)	⊘ RV602/DEC-30(B-1)
• EE mode	TP11 A TP11 B-Y	
	TP13 R-Y Minimize A	
	TRIG: TP14/DEC-30(C-4)	

11-2-10. Blanking Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
VIDEO IN : color bar signal	TP11/DEC-30(D-3)	●RV606/DEC-30(D-2)
• EE mode		
	A=0±4 mV	
	TRIG: TP14/DEC-30(C-4)	
	TP13/DEC-30(D-3)	⊘ RV607/DEC-30(C-3)
	R-Y	
	A=0±4 mV	
	TRIG: TP14/DEC-30(C-4)	

11-3. CEC BOARD ALIGNMENT

11-3-1. Chroma AFC 1/8 Clock Adjustment

Step. 1

Machine conditions for adjustment	Specifications	Adjustments
Play back the color bar signal on the alignment tape CR5-1A PS.	Minimize the clock deflection. $A=0\pm20 \text{ nsec}$	⊘ RV503/CEC-3P(A-3)

Step. 2

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO IN: color bar signal	TP504/CEC-3P(B-3)	⊘ RV506/CEC-3P(A-1)
• EE mode	A	
	Minimize the clock deflection. A=0±20 nsec	

11-3-2. Y AFC 1/8 Clock Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Play back the color bar signal on the alignment tape CR5-1A PS.	Minimize the clock deflection. $A = 0 \pm 20 \text{ nsec}$	⊘ RV505/CEC-3P(A-3)

11-3-3. Expand/Compress CCD Linearity Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	pin 31 of CN1/CEC-3P(C-4)	Spec 1:
CAMERA IN: 5-step signal		Step 1. •• RV11/DL-15[A152](C-1)
• EE mode		Step 2.
Waveform monitor:		ØRV21/DL-15[A152](B-1)
DIFF'D STEP mode	Spec 1. A=0.46±0.01V	Step 4. • RV21/DL-15[A153](B-1)
	TRIG: TP152/CEC-3P(D-3)	
Turn the RVs on the DL-15	pin 31 of CN1/CEC-3P(C-4)	Spec 2:
Board [A152 through A155] fully counterclockwise direction.	waveform monitor	Step 1. • RV12/DL-15[A152](C-1)
	portion A	Step 2.
		◆RV12/DL-15[A153](A-1) Step 3.
		⊘ RV22/DL·15[A152](B·1)
		Step 4. ORV22/DL-15[A153](B-1)
	Spec 2. Make portion A flat.	
	pin 31 of CN1/CEC-3P(C-4)	Spec 3.:
		Step 1. ⊘ RV11/DL-15[A154](C-1)
		Step 2.
	-	⊘ RV11/DL-15[A155](A-2)
		Step 3. ORV21/DL-15[A154](B-1)
		Step 4.
	Spec 3. A=0.93±0.01V	⊘ RV21/DL-15[A155](B-2)
	pin 31 of CN1/CEC-3P(C-4) waveform monitor	Spec 4: Step 1.
		ORV12/DL-15[A154](C-1)
		Step 2.
	100 %	Step 3.
		©RV22/DL-15[A154](B-1) Step 4.
	Spec 4. A=0±2%	ØRV22/DL-15[A155](B-2)

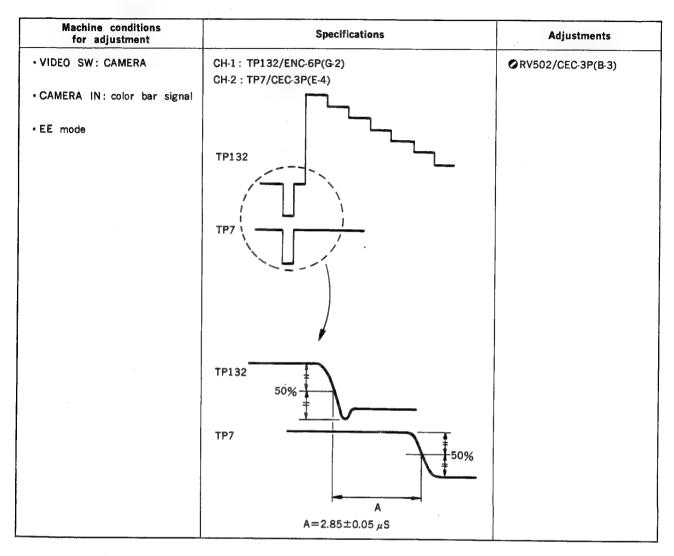
11-3-4. Expand/Compress CCD Output Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	pin 31 of CN1/CEC-3P(C-4)	⊘RV11/DL-15[A154](C-1)
		⊘ RV21/DL-15[A154](B-1)
CAMERA IN: color bar signal		⊘ RV11/DL-15[A155](B-2)
• EE mode	-7	⊘ RV21/DL-15[A155](A-2)
	A=0.93±0.01V	
	TRIG: TP152/CEC-3P(D-3)	

11-3-5. Chroma Limiter Adjustment

Machine conditions for adjustment	Specifications	Adjustments
VIDEO IN: color bar signal (chroma: +6dB) EE mode	pin 31 of CN1/CEC-3P(C-4)	⊘ RV1/LM-16(E-2)
	A=0.62±0.01 V	

11-3-6. CTDM Compress Start Timing Adjustment



11-3-7. Pre ϕ CCD Linearity Adjustment

Machine conditions for adjustment	Specifications	Adjustments
 Remove the solder bridge from the slit on the DUS-252 Board. 	TP1/CEC-3P(G-2)	⊘ RV1/DL-14[A101](E-4)
 Play back the C Linearity signal on the alignment tape CR5-1B PS. Waveform monitor: 	A 100 %	
• After the adjustment, solder the slit to the former position.	A=0 +0%	

11-3-8. Pre ϕ CCD Output Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Play back the color bar signal on the alignment tape CR5-1B PS.	TP1/CEC-3P(G-2)	⊘ RV2/CEC-3P(G-3)
	A=0.93±0.01V	

11-3-9. C Nonlinear De-emphasis Adjustment

Step 1.

Machine conditions for adjustment	Specifications	Adjustments
 Play back the color bar signal on the alignment tape CR5-1B PS. 	TP2/CEC-3P(F-2) A=0.93±0.01V	⊘ RV1/NR-18(G-4)

Step 2.

Machine conditions for adjustment	Specifications	Adjustments
Play back the color bar signal on the alignment tape CR5-1B PS.	TP15/NR-18(G-4)	⊘ RV3/NR-18(G-4)
Turn RV4 on the NR-18 Board (G-4) to the mecanical center position.		
	A=B	

Machine conditions

Specifications

Adjustments

Step 4.

Machine conditions for adjustment	Specifications	Adjustments
 Playback the color bar signal on the alignment tape CR5-1B 	TP2/CEC-3P(F-2)	⊘RV1/NR-18(G-4)
PS.	A=0.93±0.01V	

11-3-10. C Noise Canceller Adjustment

Step 1.

Machine conditions for adjustment	Specifications	Adjustments
 Play back the color bar signal on the alignment tape CR5-1A PS. 	TP2/CEC-3P(F-2)	⊘ RV5/NR-18(G-4)
	A=0.7±0.01V	

Step 2

Machine conditions for adjustment	Specifications	Adjustments
Play back the C Linearity	TP2/CEC·3P(F-2)	⊘ RV7/NR-18(G-4)
signal portion on the alignment tape CR5-1A PS.	ال الج	⊘ RV6/NR-18(G-4)
		Alternately adjust RV6 an RV7 to meet the specification.
	Minimize the overshoot or smear.	·
	Minimize the noise.	

11-3-11. Pre ϕ C SH Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Play back the color bar signal on the alignment tape CR5-1B PS.	CH-1: TP2/CEC-3P(F-2) CH-2: TP7/CEC-3P(E-4)	⊘ RV501/CEC-3P(A-1)
	TP2	
	TP7	
	A=2.30±0.05μsec	

11-3-12. Pre ϕ Y SH Adjustment

Machine conditions for adjustment	Specifications	Adjustments
 Play back the color bar signal on the alignment tape CR5-1B PS. 	CH-1: TP6/CEC-3P(E-4) CH-2: TP7/CEC-3P(E-4)	⊘ RV4/CEC-3P(F-3)
·	TP6	
	ТР7	
	A	
	$A=0.85\pm0.05\mu$ sec (center of jitter)	

11-3-13. Pre ϕ Limiter Adjustment

Step 1.

Machine conditions for adjustment	Specifications	Adjustments
• Connect TP8 on the CEC-3P Board (G-4) to E1 on the CEC-3P Board (F-2) with a shorting clip. • Play back the color bar signal on the alignment tape CR5-1B PS.	When connecting TP8 to E1	⊘ RV2/LM-15[A105](E-3)
	$A=16\pm 2\mu sec$ Read at the top of jitter.	
After the Adjustment, remove the shorting clip.	TRIG: TP6/CEC-3P(E-4)	

Step 2.

Machine conditions for adjustment	Specifications	Adjustments
for adjustment Connect TP8 on the CEC-3P Board (G-4) to TP12 on the CEC-3P Board (E-4) with a shorting clip. Play back the color bar signal on the alignment tape CR5-1B PS.	When connecting TP8 to TP12	⊘ RV1/LM-15[A105](E-3)
	A=16±2μsec	
After the adjustment, remove the shorting clip.	Read at the top of jitter. TRIG: TP6/CEC-3P(E-4)	

11-3-14. DUB CTDM Linearity Adjustment

Step 1.

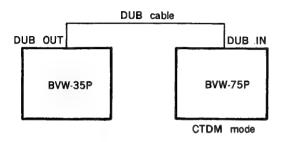
Machine conditions for adjustment	Specifications	Adjustments
 Remove the solder bridge from the slit on the DUS-252 Board. 	TP3/CEC·3P(G·1)	⊘ RV1/DL-14[A103](G-1)
 Play back the C linearity signal on the alignment tape CR5-1B PS. 	100%	
Waveform monitor: DIFF'D STEP mode	A = +0%	

Step 2.

Machine conditions for adjustment	Specifications	Adjustments
 Play back the C linearity signal on the alignment tape CR5-1B PS. 	TP4/CEC-3P(F-2)	⊘ RV1/DL-14[A104] (G-1)
• Waveform monitor: DIFF'D STEP mode	100%	
 After the adjustment, solder the slit to the former position. 	→	

11-3-15. DUB CTDM Level Adjustment

[Connection]



Machine conditions for adjustment	Specifications	Adjustments
 Play back the color bar signal on the alignment tape CR5-1B PS. After the adjustment, remove the DUB cable. 	TP5/CEC-3P(D-4)	ØRV3/CEC-3P(G-2)
	A=0.62±0.01V	

11-3-16. R-Y Comb CCD Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Play back the color bar signal on the alignment tape CR5-1B PS.	Spec 1. Symmetrize the waveform. Spec 2. Minimize the level. (A≤0.2V) TRIG: TP13/CEC-3P(D-4)	Spec 1. RV21/DL-17(C-4) Spec 2. RV22/DL-17(C-4) Alternately adjust until specification 2 is satisfied.

11-3-17. B-Y Comb CCD Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Play back the color bar signal on the alignment tape CR5-1B PS.	Spec 1. Symmetrize the waveform. Spec 2. Minimize the level. (A≤0.2V) TRIG: TP1/CEC-3P(G-2)	Spec 1. RV11/DL-17(C-2) Spec 2. RV12/DL-17(C-2) Alternately adjust until specification 2 is satisfied.

11-3-18. Expanded Output Level Adjustment (METAL)

Machine conditions for adjustment	Specifications	Adjustments
• Set S1 on the CEC-3P Board (G-3) to ON.	TP14/CEC-3P(E-4)	⊘ RV151/CEC-3P(B-2)
Play back the color bar signal on the alignment tape CR5-1B PS.	R-YA	
	A=0.70±0.05V	
	TP13/CEC-3P(D-4)	⊘RV152/CEC-3P(B-2)
	B-Y B	
	B=0.70±0.05V	

11-3-19. Free-Run Timing Adjustment

Machine conditions for adjustment	Specifications	Adjustments
 Play back the color bar (DO) signal portion on the align- ment tape CR5-1B PS. 	VIDEO OUT connector (terminated at 75 ohms)	⊘ RV504/CEC-3P(A-2)
 Turn the TRACKING control VR counterclockwise or clock- wise direction to generate the chroma tearing by sync distur- bance. 		
	Coincide	
	When turning the TRACKING control VR counterclockwise or clockwise direction, the chroma tearing by sync disturbance should not appear. *Red or green noise may appear. This noise is not related to this adjustment.	

11-4. ENC BOARD ALIGNMENT

11-4-1. Y Pedestal Difference in Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	VIDEO OUT connector (terminated at 75ohms)	RV130/ENC-6P(H-2)
CAMERA IN: color bar signal	r _L	
• EE mode		
Waveform monitor		
	Al	
	\ \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	
	A = 0±0.5 mV	

11-4-2. Y Sync Replacement Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	VIDEO OUT connector (terminated at 75 ohms)	⊘RV131/ENC-6P(G-2)
• Set S1 on the ENC-6P Board(C-1) to ON.	ا	
CAMERA IN: color bar signal		
• EE mode	ų Ų	
Waveform monitor		
 After the adjustment, set S1 on the ENC-6P Board (C-1)to OFF. 		
	V sync A Coincide side A with the V sync.	

11-4-3. Y Pedestal Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	TP133/ENC-6P(F-1)	⊘ RV137/ENC-6P(F-1)
• Set S1 on the ENC-6P Board (C-1) to ON.		
CAMERA IN: color bar signal		
• EE mode	GND level	
• After the adjustment, set S1	П	
on the ENC-6P Board (C-1) to OFF.	1	
	A	
	→ GND level	
	A=0±0.01Vdc	

11-4-4. Y EE Output Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	VIDEO OUT connector (terminated at 75 ohms)	⊘ RV134/ENC-6P(G-1)
• Set S1 on the ENC-6P Board (C-1) to ON.		
• CAMERA IN: color bar signal (100% White)		
• EE mode	^	
Waveform monitor		
• After the adjustment, set S1 on the ENC-6P Board (C-1) to OFF.	A = 1.00±0.01 V	

11-4-5. Y DUB Out Adjustment

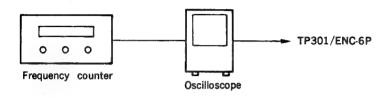
Machine conditions for adjustment	Specifications	Adjustments
· Connect the DUB OUT to the	TP402/ENC-6P(E-4)	Step. 1
DUB IN on the BVW-75P with		Metal mode
a DUB cable.		Oxide mode
• S1/ENC-6P(C-1): ON		⊘ RV100/ENC-6P(G-4) Step. 2
Step 1 PB mode		⊘ RV132/ENC-6P(G-2)
• BVW-75P : CTDM mode		
Play back the color bar signal		
on the alignment tape		
CR5-1B PS (Metal mode adj.)	A	
CR5-1A PS (Oxide mode adj.)	🛶	
Step. 2 EE mode		
• BVW-75P : Y-R, B mode	^	
· VIDEO SW: CAMERA		
· CAMERA IN: Color bar	PB mode	
signal (100% WHITE)	$\begin{array}{c} \text{EE mode} \\ \text{FR} \end{array} \} A = 1.0 \pm 0.01 \text{V}$	
• EE mode		
· After the adjustment, set S1		
on the ENC-6P Board (C-1) to		
OFF, and remove the DUB		
cable.		

11-4-6. SC Tuning Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	TP301/ENC-6P(D-3)	OLV321/ENC-6P(D-3)
• CAMERA IN: color bar signal		
• EE mode	A	
	Maximize A	
	(A ≒ 3 V)	

11-4-7. 4.43MHz OSC Adjustment

[Connection]



Machine conditions for adjustment	Specifications	Adjustments
 Wait for more than three minutes after the power is turned on. 	TP301/ENC-6P(D-3)	◆ CV351/ENC-6P(C-2)
· VIDEO SW: CAMERA	4.433619MHz±5 Hz	
• CAMERA IN: color bar signal		
• EE mode		
• Frequency counter		

11-4-8. Clamp Pulse Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	CH-1: TP501/ENC6P(C-3)	⊘ RV504/ENC-6P(A-4)
	CH-2: TP506/ENC-6P(A-4)	
· CAMERA IN: color bar signal		•
· Waveform monitor	TP501	
• EE mode	TP506	
Wait for more than one	l A l	
minute and thirty seconds	 ← → 	
after the EE mode.	A=8.1±0.05μs	

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	VIDEO OUT connector (terminated at 75 ohms)	B-Y(H axis)
· CAMERA IN: color bar signal	لمر	⊘ RV202/ENC-6P(F-3)
	"	R-Y(V axis)
Waveform monitor	<u> </u>	
• EE mode		
EE HIOOG		Alternately adjust
	•	
	1	
	KANAAMAWWA	
	Minimize A	

11-4-10. Chroma Carrier Balance Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	VIDEO OUT connector (terminated at 75 ohms)	⊘ RV201/ENC-6P(F-3)
· CAMERA IN: color bar signal		⊘ RV241/ENC-6P(F-3)
• Waveform monitor	\ \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	Alternately adjust.
• EE mode		
• Wait for more than one	PHILIPPIN A A A A A A A A A A A A A A A A A A A	
minute and thirty seconds after the EE mode.		
	Minimize A	
	(A ≤ 14 mV)	

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11-4-11. Chroma Balance Vertical Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	VIDEO OUT connector (terminated at 75 ohms.)	⊘ RV302/ENC-6P(D-2)
· CAMERA IN: PHASE-90(P-90)	When the luminescent spot is in the vertical line. vectorscope	
• EE mode	75% A B	
	When the luminescent spot is in the horizontal line. vectorscope A' 75%	
	B' A' = B'	

11-4-12. Chroma Balance Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	VIDEO OUT connector (terminated at 75 ohms)	⊘ RV203/ENC-6P(F-2)
CAMERA IN: color bar signal	Luminescent spots on vectorscope	
• EE mode		
• Set the vectorscope gain to UNCAL, and adjust so that R and C_{Υ} are located in " \boxplus ",		
	○ : OK ● : NG	
	Repeat until twelve luminescent spots satisfy the specification.	

11-4-13. Burst Balance/Level Adjustment

Specifications	Adjustments
VIDEO OUT connector (terminated at 75 ohms.)	Balance
vectorscope	⊘ RV243/ENC-6P(F-2)
	Level ⊘ RV301/ENC-6P(D-3)
	,
О: ок	
75% • : NG	
Balance Adj :The burst level should be same.	
Level Adj :Place the luminescent spot of burst at	
	VIDEO OUT connector (terminated at 75 ohms.) vectorscope O: OK 75% Balance Adj: The burst level should be same.

11-4-14. Chroma Level Adjustment

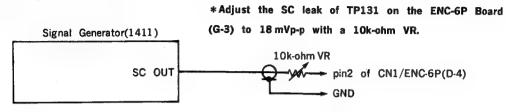
Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	VIDEO OUT connector (terminated at 75 ohms)	⊘ RV135/ENC-6P(F-1)
• CAMERA IN: color bar signal	vectorscope Burst's luminescent spot: 75%	
• EE mode	75% — ○ : OK • : NG	
	Twelve luminescent spots should be located in "\H".	

11-4-15. Video Out Y/C Delay Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	VIDEO OUT connector (terminated at 75 ohms)	◆RV133/ENC-6P(G-2)
CAMERA IN: pulse/bar signal		When the peak is not satisfied the specification.
• EE mode	ا المرابعات المر	DL101/ENC-6P(H-2) soldering side
• Set the line selector in the	u /	COULD SIGN
waveform monitor to OFF.	$\oint_{\mathbf{I}}$	899 •
		• Adjust with RV133 changing the tap.
	The peak is located in the center.	
	Spec.1 OK OK NG NG	
	Y delayed Y advanced (0±5 nsec)	
	[NOTE] Check that the specifications 1 and 2 are satisfied on condition that each video board is directry connected to the main unit without an EX-150 extension board.	

11-4-16. SC Leak Cancel Adjustment

[Connection]



Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	VIDEO OUT connector (terminated at 75 ohms)	level adjustment
		Ø RV136/ENC-6P(F-1)
CAMERA IN: color bar signal		
	™	phase adjustment
• Set S1 on the ENC-6P Board		
(C-1) to ON.	7.,	
a EE manda		
• EE mode		
· Waveform monitor	Ц	
• After the adjustment, set S1	■: SC leak	
on the ENC-6P Board (C-1) to	Minimize the SC leak level	
OFF.		

11-4-17. Chroma DUB Out Adjustment

Machine conditions for adjustment	Specifications	Adjustments
 Connect DUB OUT to DUB IN on the BVW-75P with DUB cable. 	TP404/ENC-6P(E-4)	R-Y • RV431/ENC-6P(E-3)
· VIDEO SW: CAMERA		
• BVW-75P: Y-R, B mode	R-Y — A	
• CAMERA IN: color bar signal	<u> </u>	
• EE mode	$A = 0.70 \pm 0.01 \text{ V}$	
	TP403/ENC-6P(E-4)	B-Y
	B-Y B	⊘ RV421/ENC-6P(E-3)
	B = 0.70±0.01 V	

11-4-18. B-Y Level Adjustment

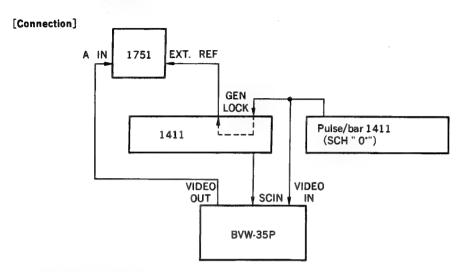
Machine conditions for adjustment	Specifications	Adjustments
• VIDEO IN : color bar signal (100-100-0)	TP11/DEC-30(C-3) TP403/ENC-6P(E-4)	⊘RV610/DEC-30(D-2)
• EE mode	B-Y A	
	A=0.70±0.01 V	

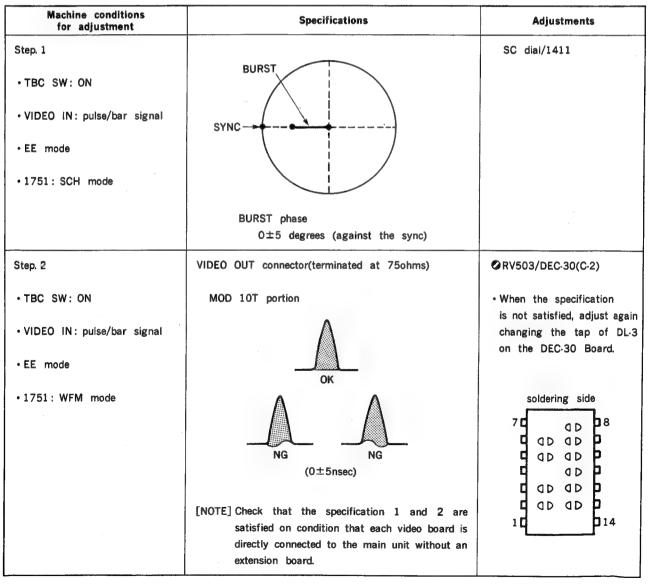
Machine conditions for adjustment	Specifications	Adjustments
VIDEO IN: color bar signal (100-100-0) EE mode	TP13/DEC-30(C-3) TP404/ENC-6P(E-4)	⊘ RV601/DEC-30(C-1)
	A=0.70±0.01 Vp-p	

11-4-20. CC Delay Adjustment

Machine conditions for adjustment	Specifications	Adjustments
VIDEO IN : color bar signal (REVERSE) EE mode	VIDEO OUT connector(terminated at 75ohms) Vectorscope V R Cr MG 75% 100% Points A and B should correspond to the V axis.	◆RV611/DEC-30(C-2)

11-4-21. Composite Y/C Delay Adjustment





11-4-22. Y Nonlinear De-emphasis Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Step 1		ORV101/ENC-6P(F-4)
Play back the color bar signal on the alignment tape CR5-1B PS.	TP131/ENC-6P(G-3)	
	A=1.0±0.01 V	
Step. 2		
 Play back the pulse/bar signal on the alignment tape CR5-1B PS. 	TP101/ENC-6P(G-4)	⊘ RV102/ENC-6P(G-4)
	A	
	A=B	

Machine conditions for adjustment	Specifications	Adjustments
Step. 3		
• Play back the gated sweep	TP131/ENC-6P(G-3)	
signal on the alignment tape CR5-1B PS.	0 1 2 3 4 5 5.5 0.5	
	NG 0.51 2 3 4 5 5.5	
	NG 00.5_1 2 3 4 5 5.5	
	OK 00.51 2 3 4 5 5.5 OK Make flat the frequency response in low frequency	
	level (0 through 1 MHz).	
	NG 0.51 2 3 4 5 5.5	 RV104/ENC-6P(F-4) Alternately adjust RV103 and RV104 to meet the
	OK 00.51 2 3 4 5 5.5	specification.
	NG 00.51 2 3 4 5 5.5	
	Adjust the high frequency level. (2 through 4 MHz)	
	frequency level 0.5 MHz 100%(reference)	
	1 MHz 100±4 % 2 MHz 100±6 %	
	3 MHz 100±6 % 4 MHz 100±6 % 5 MHz 100±6 %	

Machine conditions for adjustment	Specifications	Adjustments
Step. 4		
Play back the pulse/bar signal on the alignment tape CR5-1B	TP131/ENC-6P(G-3)	
PS.		
	OK NG NG	
	Check the waveform. When the specification is not satisfied, perform step 2 and 3 again.	

11-4-23. PB Y/C Delay Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Play back the LINE 17 signal on the alignment tape CR5-1B PS.	VIDEO OUT connector (terminated at 75 ohms) The peak should be located in the center. OK OK NG NG	
• Set the line selector on the	Y delayed Y advanced Spec. 1	ØRV501/ENC-6P(A-2)
waveform monitor to OFF.	0±10 nsec	ORVSUI/ENC-6P(A-2)
 Set the line selector on the waveform monitor to 15 LINE, and FIELD switch to 1+3 and 2+4. 	Spec. 2 Difference between fields 0±20 nsec	
	CH-A: 1+3, CH-B: 2+4	

[NOTE] Check that the specification 1 and 2 are satisfied on condition that each video board is directly connected to the main unit without an extension board.

11-4-24. False H Sync Frequency Adjustment

Adjustments
ØRV503/ENC-6P(A-2)
_

11-4-25. H-AFC Error Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO IN: color bar signal	TP503/ENC-6P(A-2)	OLV551/ENC-6P(A-3)
• EE mode	*************************************	
	A	
	$A = 2.5 \pm 0.1 \text{ Vdc}$	

11-4-26. H-AFC VCO Duty Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO IN: color bar signal	TP504/ENC-6P(B-3)	⊘ RV502/ENC-6P(A-4)
• EE mode	A: B = 50: 50±2	

11-4-27. PB DUB OUT Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Play back the color bar signal on the alignment tape CR5-1B	DUB OUT connector (terminated at 75 ohms)	
PS.		⊘ RV151/CEC-3P(B-2)
	R-Y	
	A=0.70±0.01 V	
	B-Y	◆RV152/CEC-3P(B-2)
	B=0.70±0.01 V	

11-4-28. Video Out Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
• VIDEO IN: color bar signal	VIDEO OUT connector (terminated at 75 ohms)	◆RV504/DEC-30(E-2)
• EE mode	$A = 1.0 \pm 0.01 \text{ V}$	

11-4-29. DEC Vector Adjustment

RV610/DEC30(D-2) RV601/DEC30(C-1) A A B B B B B B B B B B B

11-4-30. VITC Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Step. 1		
• VITC REC SW: ON (front panel)	VIDEO OUT connector (terminated at 75 ohms)	ØRV509/DEC30(C-3)
• VIDEO IN: color bar signal	A	
• EE mode		
• Waveform monitor	A = 0.56±0.03 V	
Step. 2		
VITC REC SW: ON (front panel)	VIDEO OUT connector (terminated at 75 ohms)	
· VIDEO SW: CAMERA	A	
• CAMERA IN: color bar signal		
• EE mode	A = 0.56±0.03 V	
• Waveform monitor		

11-4-31. Video Meter Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Step. 1		
METER select SW: VIDEO	CH-1/CH-2 level meter	CH-1 meter
(front panel)	-3	⊘ RV9/MT-34
· VIDEO SW: CAMERA	*3	CH-2 meter
CAMERA IN: color bar signal		⊘ RV10/MT-34
• EE mode		
• Put the main unit vertically.		
	The pointer reading should be "+3".	
	CH-3 level meter	
	-3	CH-3 meter
	׳³	⊘ RV11/MT-34
	/	
	The pointer reading should be "O".	
Step. 2		
METER select SW: VIDEO	CH-4 level meter	CU 4 materi
(front panel)	-3 • 0	CH-4 meter ⊘RV12/MT-34
VIDEO IN: color bar signal	× ₃	
• EE mode		
Put the unit perpendicular to		
the floor.		
	The pointer reading should be "O".	

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	TP102/MDM-3P(C-2)	⊘ RV101/MDM-3P(B-2)
CAMERA IN: 50% flat field signal	REF SYNC	
• EE mode	B	
	A:B=4:5	·
	TRIG: TP101/MDM-3P(B-3)	

11-5-2. Y Ref Sync Position Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	TP102/MDM-3P(C-2)	⊘ RV611/TG-31(A-2)
CAMERA IN: 50% flat field signal EE mode	- (- (- (- (- (- (- (- (- (- (- (- (- (-	
	Delay 50% A=2.65±0.02μsec	
	TRIG: TP101/MDM-3P(B-3)	

11-5-3. Y Ref Sync Width Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	TP102/MDM-3P(C-2)	⊘ RV612/TG-31(B-2)
CAMERA IN: 50% flat field signal	1-(1)	
• EE mode	Delay 50% A = 5±0.05 µ sec TRIG: TP101/MDM-3P(B-3)	

11-5-4. C Ref Sync Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	TP202/MDM-3P(B-2)	⊘ RV201/MDM-3P(A-2)
CAMERA IN: 75% color bar signal		
Insert a BCT-20K cassette tape.	╷╼┤┞╾╢╟┰┞═╅	
• EE mode		
	With respect to video level A (100 %), the sync level is as follows:	
	B=120±2%	
	TRIG: TP101/MDM-3P(B-3)	

11-5-5. C Ref Sync Width Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	TP202/MDM-3P(B-2)	♥ RV614/TG-31(C-2)
CAMERA IN: 75% color bar signal EE mode	Delay 50% A=1.9±0.05μsec	
	TRIG: TP101/MDM-3P(B-3)	

11-5-6. C Ref Sync Position Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	CH-1: TP102/MDM-3P(C-2)	⊘ RV613/TG-31(B-1)
CAMEDA INI. EOO. Sha Sinid	CH-2: TP202/MDM-3P(B-2)	
• CAMERA IN: 50% flat field signal	·	
	dr	
• EE mode	CH-1 — U	
	CH2 — L	
	TP102	
	CH-1 50%	
	[L	
	————A	
	TP202	
	CH-2 50%	
•		İ
	A=0.25±0.02μsec	
	TRIG: TP101/MDM-3P(B-3)	

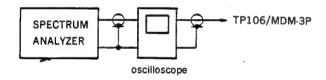
11-5-7. Y Pre-emphasis Mix Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
VIDEO SW: CAMERA CAMERA IN: 2T pulse/bar signal EE mode	Spec 1. A=B Spec 2. C=88±2mV	Spec 1.
	TRIG: TP101/MDM-3P(B-3)	·

11-5-8. C Pre-emphasis Mix Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
VIDEO SW: CAMERA CAMERA IN: 2T pulse/bar signal EE mode	TP203/MDM-3P(A-2) Spec 1. A=B	Spec 1. ◆ RV202/MDM-3P(A-2) Spec 2. ◆ RV203/MDM-3P(A-2)
	Spec 2. C=95±2mV TRIG: TP101/MDM-3P(B-3)	

11-5-9. Y Modulator Deviation/Carrier Set Adjustment



Befor performing this adjustment, perform section 11-1-9. Y Output Level Adjustment (MDM-3P Board).

Step 1.

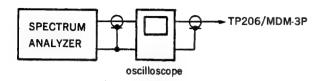
Machine conditions for adjustment	Specifications	Adjustments
VIDEO IN: 100% flat field signal	TP106/MDM-3P(B-3)	Deviation adjustment ⊘RV106/MDM·3P(C-2) Carrier adjustment
• Insert a BCT-20M cassette tape.	dB dB	⊘ RV107/MDM-3P(C-4)
EE mode Audjust with a spectrum analyzer.	6.8 7.4 8.8 [MHz]	
	Deviation adjustment Adjust the gap between two peak values to 1.4 MHz. Carrier adjustment Adjust the small peak value on the left to 6.8 MHz.	

Step 3.

Machine conditions for adjustment	Specifications	Adjustments
 Supply 75% color bar signal to the VIDEO IN connector, and put the unit into the self-REC/PB mode. 	TP306/MDM-3P(F-4)	
Check with a metal tape and an oxide tape.	A=1.0±0.01V	
	When the specification is not satisfied, repeat Steps 1. and 2.	

11-5-10. C Modulator Deviation/Carrier Set Adjustment

[Connection]



Befor performing this adjustment, perform section 11-1-10. C Output Level Adjustment (MDM-3P Board).

Step 1.

Machine conditions for adjustment	Specifications	Adjustments
• VIDEO IN: 75% color bar signal	TP206/MDM-3P(A-3)	Deviation adjustment • RV206/DV-7
Insert a BCT-20M cassette tape.	dB Aud und	Carrier adjustment ☑ RV207/MDM-3P(B-4)
• EE mode • Adjust with a spectrum		
analyzer.	5.6 MHz 6.1 ±0.005 MHz 6.6 MHz	

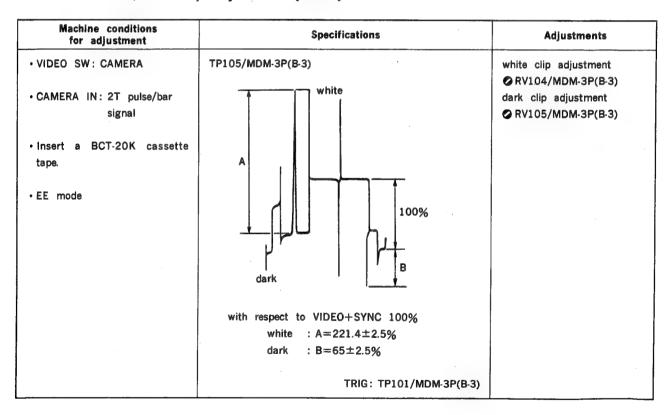
Step 2

Machine conditions for adjustment	Specifications	Adjustments
• VIDEO ÎN: 75% color bar signal	TP206/MDM-3P(A-3)	Deviation adjustment ◆ RV214/DV-7
• Insert a BCT-20K cassette tape.	dB	Carrier adjustment RV208/MDM-3P(B-4)
• EE mode		
Adjust with a spectrum analyzer.	4.0 MHz 4.5±0.005 MHz 5.0 MHz	

Step3

Machine conditions for adjustment	Specifications	Adjustments
• VIDEO IN: 75 % color bar signal	TP406/MDM-3P(D-4)	
• Self-REC/PB mode	m N I	
Check with a metal tape and an oxide tape.		
	$A = 0.70 \pm 0.01 V$	
,	(Measured in the noise center)	
	When the specification is not satisfied, repeat	
	Steps 1. and 2.	

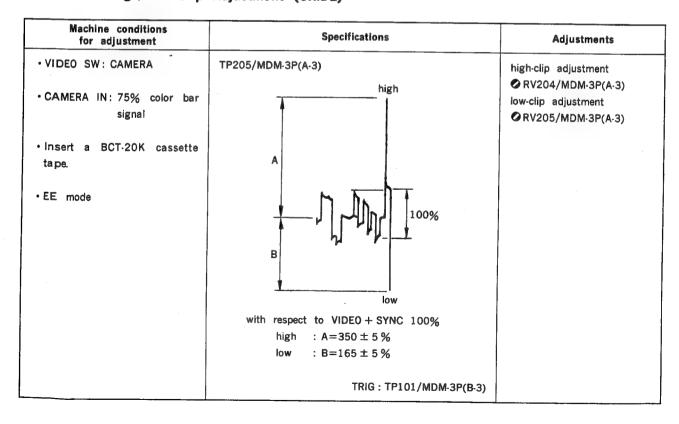
11-5-11. Y White/Dark Clip Adjustment (OXIDE)



11-5-12. Y Dark Clip Adjustment (METAL)

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	TP105/MDM-3P(B-3)	dark clip adjustment • RV113/MDM-3P(B-3)
CAMERA IN: 2T pluse/bar signal	white	3 (VIII) (MDIM-3F(B-3)
• Insert a BCT-20M cassette tape.		
• EE mode	dark 100%	
	with respect to VIDEO + SYNC 100% dark: B=100±2.5%	
	TRIG: TP101/MDM-3P(B-3)	

11-5-13. C High/Low Clip Adjustment (OXIDE)



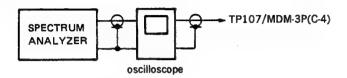
11-5-14. Y REC HF Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	TP108/MDM-3P(C-4)	● RV109/MDM-3P(C-4)
• CAMERA IN: H sweep 140% signal	A A	
• Insert a BCT-20M cassette tape.	A=50±2mV	
• EE mode	(measured in the waveform center)	
	TP107/MDM-3P(C-4)	⊘ RV110/MDM-3P(C-4)
	A	
	A=500±10mV	

11-5-15. C REC HF Adjustment

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	TP208/MDM-3P(A-3)	⊘ RV209/MDM-3P(B-3)
• CAMERA IN: H sweep 140% signal		
• Insert a BCT-20K cassete tape.	^^	
• EE mode	A=20±1 mV	
	(measured in the waveform center)	•
	TP207/MDM-3P(A-4)	⊘ RV210/MDM-3P(B-4)
	A	
	A=350±10 mV	

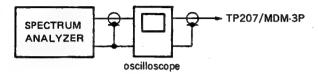
11-5-16. Y Modulator Secondary Distortion Adjustment



Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	TP107/MDM-3P(C-4)	⊘ RV111/MDM-3P(B-4)
CAMERA IN: 50% flat field signal		
• Insert a BCT-20M cassette tape	A	
• EE mode		
After the adjustment, insert a		
BCT-20K cassette tape and check that Spec 2 is satisfied.	second higher harmonic	
	Minimize the second higher harmonic level.	
	Spec 1. A≥45dB (METAL)	
	Spec 2. A≥40dB (OXDIE)	

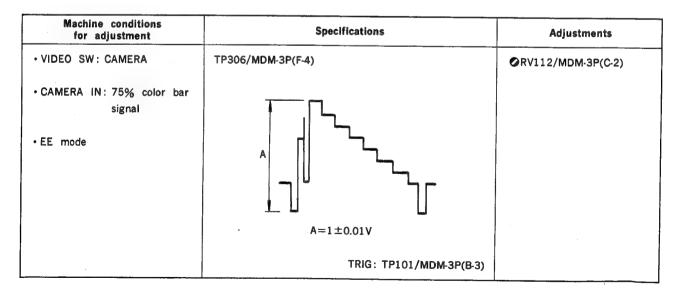
11-5-17. C Modulator Secondary Distortion Adjustment

[Connection]



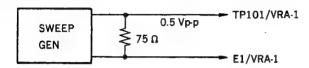
Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	TP207/MDM-3P(A-4)	⊘ RV211/MDM-3P(A-4)
CAMERA IN: flat field 3 signal		
• Insert a BCT-20M cassette tape.		
• EE mode		
After the adjustment, insert a BCT-20K cassette tape and		
check that the Spec 2. is satisfied.	second higher harmonic	
	Minimize the second higher harmonic level.	
	Spec 1. A≧45 dB (METAL)	
	Spec 2. A≥35 dB (OXDIE)	

11-5-18 EE DUB Y Output Level Adjustment



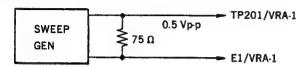
11-6. VRA BOARD ALIGNMENT

11-6-1. Y REC Current Frequency Response Adjustment (METAL)



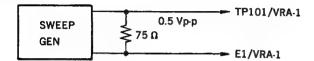
Machine conditions for adjustment	Specifications		Adjustments
Remove CN1 on the VRA-1	CH-A: TP102/VRA-1		CH-A:
Board.	CH-B: TP103/VRA-1		
			CH-B:
· VIDEO SW: CAMERA			⊘ RV109/VRA-1
· CAMERA IN: color bar signal	8000 8000		
· Connect the SWEEP GEN			
described above, and supply			
the RF sweep signal.	2 MHz	10 MHz	İ
Insert a BCT-20M cassette			
tape.		•	
• REC mode	frequency	level	i
The mode	2MHz	100% reference	ļ
	10MHz	70%±20	
After the adjustment, mount			
the CN1 on the VRA-1 Board.		TRIG: TP44/SV-94	D(11)

11-6-2. C REC Current Frequency Response Adjustment (METAL)



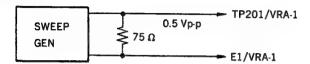
Machine conditions for adjustment	Specifications		Specifications		Adjustments
Remove CN1 on the VRA-1 Board. VIDEO SW: CAMERA	CH-A: TP202/VRA-1 CH-B: TP203/VRA-1			CH-A: RV207/VRA-1 CH-B: RV209/VRA-1	
 CAMERA IN: color bar signal Connect the SWEEP GEN described above, and supply RF sweep signal. 	2 MHz	10 MHz		,	
Insert a BCT-20M cassette tape.	frequency 2MHz	level			
· REC mode	10MHz	60%+20			
After the adjustment, mount CN1 on the VRA-1 Board.		TRIG: TP44/S	V-94P(J-1)		

11-6-3. Y REC Current Frequency Response Adjustment (OXIDE)



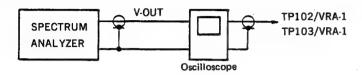
Machine conditions for adjustment	Specifications			Adjustments
Remove CN1 on the VRA-1	CH-A: TP102/VRA-1			CH-A:
Board.	CH-B: TP103/VRA-1			
VIDEO SW: CAMERA				CH-B: ⊘ RV110/VRA-1
CAMERA IN: color bar signal				
Connect the SWEEP GEN		10 MHz		
described above, and supply	2 MHz			
RF sweep signal.				
Insert a BCT-20K cassette	frequency	level		
tape.	2MHz	100% reference		
	10MHz	70%+20		
REC mode		•		
After the adjustment, mount				
CN1 on the VRA-1 Board.		TRIG: TP44/S	SV-94P(J-1)	

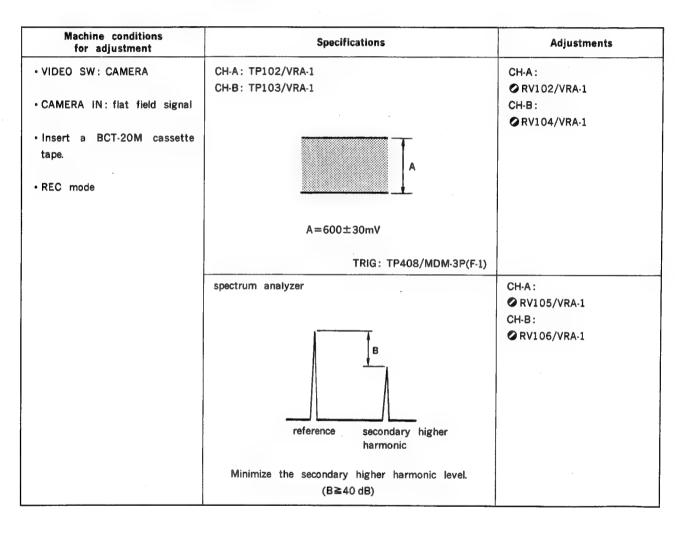
11-6-4. C REC Current Frequency Response Adjustment (OXIDE)



Machine conditions for adjustment	Specifications		Adjustments
Disconnect CN1 on the VRA-1 Board.	CH-A: TP202/VRA-1 CH-B: TP203/VRA-1		CH-A: ⊘ RV208/VRA-1 CH-B:
· VIDEO SW: CAMERA			⊘ RV210/VRA-1
• CAMERA IN: color bar signal			
· Connect the SWEEP GEN		10 MHz	
described above, and supply RF sweep signal.	2 MHz	TOWNZ	
Insert a BCT-20K cassette	frequency	levei	
tape.	2MHz	100% reference	
REC mode	10MHz	60%+20	
After the adjustment, connect			
CN1 on the VRA-1 Board.		TRIG: TP44/S	V-94P(I-1)

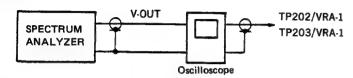
11-6-5. Y REC Amp Secondary Distortion Adjustment





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11-6-6. C REC Amp Secondary Distortion Adjustment



Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	CH-A: TP202/VRA-1	CH-A:
	CH-B: TP203/VRA-1	Ø RV202/VRA-1
CAMERA IN: flat field signal		CH-B:
• Insert a BCT-20M cassette		⊘ RV204/VRA-1
tape.	A	
• REC mode	<u> </u>	
•	A=700±10mV	
	TRIG: TP408/MDM-3P(F-1)	
	spectrum analyzer	CH-A:
		Ø RV205/VRA-1
		CH-B:
	В	⊘ RV206/VRA-1
	reference secondary higher harmonic	
	Minimize the secondary higher harmonic level. (B≧40 dB)	

11-6-7. Y REC Current Adjustment (METAL)

Machine conditions for adjustment	Specifications	Adjustments
Step 1.	TP301/MDM-3P(F-3)	CH-A:
· VIDEO SW: CAMERA		Ø RV102/VRA-1
	A B	CH-B:
• CAMERA Y IN: flat field 1		ØRV104/VRA-1
signal		
• Insert a BCT-20M cassette tape.		
• REC mode		
	Maximize the amplitude A and B.	
	TRIG: TP308/MDM-3P(F-3)	
Step 2.		
Play back the self recorded	Cceck: A=B=0.5±0.1 V	
portion on the BCT-20M	(The voltage difference between	
cassette tape.	CH-A and CH-B should be within 0.1V)	
Maximize the RF level with the TRACKING control VR.	·	
	TRIG: TP308/MDM-3P(F-3)	
	CH-A: TP102/VRA-1	
	CH-B: TP103/VRA-1	
	A	
	Check: A=600±100mV	

11-6-8. Y REC Current Adjustment (OXIDE)

A B B	CH-A:
c 1. imize the amplitude of A and B. c 2. B=Value on TP102 or TP103/VRA-1+50mV	
TRIG: TP308/MDM-3P(F-3)	
Check: A=B=0.5±0.1 V (The voltage difference between CH-A and CH-B should be within 0.1V)	
3: TP103/VRA-1	
	TRIG: TP308/MDM-3P(F-3) A: TP102/VRA-1 B: TP103/VRA-1 Check: A=430±80 mV

11-6-9. C REC Current Adjustment (METAL)

Machine conditions for adjustment	Specifications	Adjustments
Step 1. • VIDEO SW: CAMERA	TP401/MDM-3P(D-3)	CH-A: ⊘ RV202/VRA-1
• CAMERA C IN: flat field 3	A B	CH-B: ©RV204/VRA-1
 Insert a BCT-20M cassette tape. REC mode 		
	Spec 1. Maximize the amplitude of A and B. Spec 2. A=B=Value on TP202 or TP203/VRA-1-200 mV	
	TRIG: TP408/MDM-3P(F-1)	
Step 2.		
 Play back the self recorded portion on the BCT-20M cassette tape. 	Check: $A=B=0.5\pm0.1 \text{ V}$ (The voltage difference between CH-A and CH-B should be within 0.1V.)	
Maximize the RF level with the	TRIG: TP408/MDM-3P(F-1)	
TRACKING control VR.	CH-A: TP202/VRA-1 CH-B: TP203/VRA-1	
	A	
	Check: A=500±70 mV	

11-6-10. C REC Current Adjustment (OXIDE)

Machine conditions for adjustment	Specifications	Adjustments
Step 1. • VIDEO SW: CAMERA	TP401/MDM-3P(D-3) A B	CH-A: ORV201/VRA-1 CH-B:
CAMERA C IN: flat field 3 Insert a BCT-20K cassette		ØRV203/VRA-1
tape. • REC mode		
	Maximize the amplitude of A and B. TRIG: TP408/MDM-3P(F-1)	
Step 2. • Play back the self recorded portion on the BCT-20K cassette tape.	Check: A=B=0.5±0.1V (The voltage difference between CH-A and CH-B should be within 0.1V.)	
Minimize the RF level with the TRACKING control VR.	TRIG: TP408/MDM-3P(F-1)	
	CH-A: TP202/VRA-1 CH-B: TP203/VRA-1	
	A	
	Check: A=340 ⁺¹⁰⁰ ₋₄₀ mV	

11-6-11. Overall Y/C RF Balance/Level Adjustment

Step 1. Y/C RF BALANCE/LEVEL CHECK (METAL)

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	[Y RF balance/level]	
	TP301/MDM-3P(F-3)	
· CAMERA IN: flat field 3		
	<u> </u>	
• Insert a BCT-20M cassette		
tape, and put the unit into the	CH-A CH-B	
self REC/PB mode.		
	8 <u>4 8 4 8 </u>	
• TRACKING: Maximize the RF	[
level	Spec 1. CH-A=CH-B=0.50±0.1 V	
	Spec 2. The voltage difference between CH-A and	
	CH-B should be within 0.05 V.	
	TRIG: TP308/MDM-3P(F-3)	
	[C RF balance/level]	***************************************
	TP401/MDM-3P(D-3)	
	CH-A CH-B	
	Spec 1. CH-A=CH-B=0.5±0.1 V	
	Spec 2. The voltage difference between CH-A and	
	CH-B should be within 0.05 V.	
	TRIG: TP408/MDM-3P(F-1)	

^{* 1.} When the specification in the Step 1. is not satisfied, perform section 11-6-7 and 11-6-9 within the specification.

Step 2. Y/C RF BALANCE/LEVEL CHECK (OXIDE)

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	[Y RF balance/level]	
• CAMERA IN: flat field 3	TP301/MDM-3P(F-3)	•
 Insert a BCT-20K cassette tape, and put the unit into the self REC/PB mode. 	CH-A CH-B	
• TRACKING: Maximize the RF		
level	Spec 1. CH-A=CH-B=0.5±0.1 V	
	Spec 2. The voltage difference between CH-A and CH-B should be within 0.1V	
	TRIG: TP308/MDM-3P(F-3)	
	[C RF balance/level] TP401/MDM-3P(D-3)	
	CH-A CH-B	
	Spec 1. CH-A=CH-B=0.5±0.1 V Spec 2. The voltfge difference between CH-A and	
	CH-B should be within 0.1 V.	
	TRIG: TP408/MDM-3P(F-1)	

^{* 2} When the specification in Step 2. is not satisfied, perform section 11-6-8 and 11-6-10 within the specification.

11-6-12. Overall Y Frequency Response Check

Machine conditions for adjustment	Specifications	Adjustments
 Set the S1 on the ENC-6P Board (C-1) to the ON position. VIDEO SW: CAMERA CAMERA IN: multi-burst signal 	TP132/ENC-6P (H-2)	
 Insert a BCT-20M cassette tape, and put the unit into the self-REC/PB mode. After the adjustment, insert a BCT-20K cassette tape, and put the unit into the self-REC/PB mode. 	• METAŁ Frequency Level 0.5MHz 100% Reference 1 MHz 100±5% 2 MHz 100±5% 4 MHz 100±5% 5 MHz 100±5% 5.5MHz 100±5% 5.5MHz 100±5% 6 MHz 100±5%	

[•] When the specification is not satisfied, perform 11-6-14. Overall Y/C Frequency Response Adjustment.

11-6-13. Overall C Frequency Response Check

Set S1 on the ENC-6P Board (C-1) to the ON position. VIDEO SW: CAMERA CAMERA IN: multi-burst signal
· VIDEO SW: CAMERA
• CAMERA IN: multi-burst signal
Insert a BCT-20M cassette
tape, and put the unit into the • METAL • OXIDE
self-REC/PB mode. Frequency Level Frequency Level
0.2MHz 100% Reference 0.2MHz 100%Reference
After the adjustment, insert a 0.5MHz 100±5% 0.5MHz 100±5%
out the unit into the self-REC/ 1 MHz 100±10% 1 MHz 100±5%
PB mode. 1.5MHz 100 ⁺¹⁰ / ₋₂₅ % 1.5MHz 100 ⁺⁵ / ₋₂₅ %

[•] When the specification is not satisfied, perform section 11-6-14. Overall Y/C Frequency Response Adjustment.

11-6-14. Overall Y/C Frequency Response Adjustment

When performing this step, refer to the sections as follows.

11-6-1, 11-6-3. Y REC Current Frequency Response Adjustment (METAL)(OXIDE)

11-6-2, 11-6-4. C REC Current Frequency Response Adjustment (METAL)(OXIDE)

Perform adjustment for both Y and C.

Machine conditions for adjustment	Specifications	Adjustments
• When Y frequency response adjustment This is same as section 11-6-1 and 11-6-3.	[When high-range level is higher in step 1.] • Y adjustment CH-A: TP102/VRA-1 CH-B: TP103/VRA-1.	• Y adjustment (METAL) CH-A: ORV107/VRA-1 CH-B: ORV109/VRA-1
	CH-A: TP202/VRA-1 CH-B: TP203/VRA-1	• Y adjustment (OXIDE) CH-A: ORV108/VRA-1 CH-B:
	2 MHz 10 MHz	• C adjustment (METAL) • CH-A: • RV207/VRA-1
	Raise the 10 MHz level.	CH-B : ⊘ RV209/VRA-1
	[When high-range level is lower in step 1.] • Y adjustment CH-A: TP102/VRA-1 CH-B: TP103/VRA-1	• C adjustment (OXIDE) CH-A: ◇RV208/VRA-1 CH-B: ◇RV210/VRA-1
	CH-A: TP202/VRA-1 CH-B: TP203/VRA-1	
	2 MHz 10 MHz	
	Raise the 10 MHz level.	

After the adjustment, perform check item in the following adjustment.

11-6-7. Y REC Current Adjustment (METAL)

11-6-8. Y REC Current Adjustment (OXIDE)

11-6-9. C REC Current Adjustment (METAL)

11-6-10. C REC Current Adjustment (OXIDE)

11-6-15. CONFI Output Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Connect pin 14 of CN1 on the MDM-3P Board (D-4) to GND with a shorting clip.	Step 1. VIDEO OUT Connector (terminated at 75ohms)	⊘ RV1(IC505)/MDM-3P(E-1)
• CONFI SW: Y		
 Play back the color bar (DO) signal on the alignment tape CR5-1B PS. 	A=1.0±0.1 V	
	TRIG: TP308/MDM-3P(F-3)	
	Step 2. VIDEO OUT connector (terminated at 75 ohms)	⊘ RV2(IC505)/MDM-3P(E-1)
	DO portion	
	Coincide DO portion with the 3 rd step.	·
	* Repeat Step 1. and 2 until the value satisfy the specification.	
	TRIG: TP308/MDM-3(F-3)	
· CNFI SW: C	Step 3. VIDEO OUT Connector (terminated at 75ohms)	
 After the adjustment, remove the shorting clips. Set the CONFI SW to OFF. 	A=0.5±0.1V	

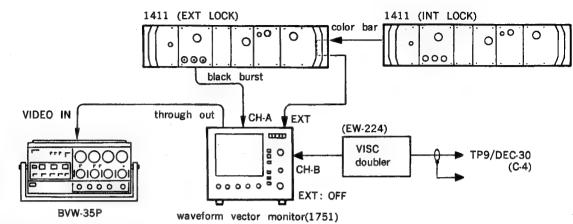
11-7. VIDEO OVERALL PHASE ADJUSTMENT

11-7-1. VISC Adjustment

Step 1.

Machine conditions for adjustment	Specifications	Adjustments
 Turn RV505 on the DEC-30 Board (E-2) fully clockwise direction. Set RV506 on the DEC-30 Board (E-2) to the mechanical center position. 	TP9/DEC-30(C-4)	Spec 1. ②RV507/DEC-30(E-2) Spec 2. ②RV505/DEC-30(E-2)
VIDEO IN: black burst signal	Spec 1: $A = 0.35 \pm 0.01V$ Spec 2: $B = 0.3 \pm 0.01V$	
• EE mode		
• waveform vector monitor: WFM mode (line selector 8 line)		

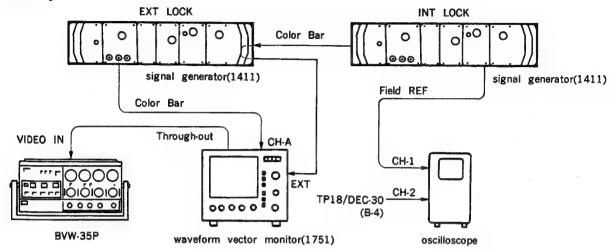




Machine conditions for adjustment	Specifications	Adjustments
· VIDEO IN: black burst signal	waveform vector monitor	◆ RV506/DEC-30(E-2)
• EE mode		
 Set SCH phase to zero degree with the SC PHASE control knob on the signal generator. 	0· [vector mode	-

11-7-2. VISC Mute Adjustment

Machine conditions for adjustment	Specifications	Adjustments
VIDEO IN: color bar signal EE mode waveform monitor: WFM mode (line selector 8 line)	VIDEO OUT connector (terminated at 75ohms)	⊘ RV401/ENC-6P(E-1)
	A → 0	



Step 1

Machine conditions for adjustment	Specifications	Adjustments
VIDEO Level: center clicked position	Waveform vector monitor +90°	SC PHANE control knob on the signal generator
• VIDEO IN: color bar signal		
• EE mode		
• Set the SCH phase to the O-degree position with the SC	0.	
PHASE control knob on the EXT LOCK 1411.		
	-90.	
	[SCH mode]	

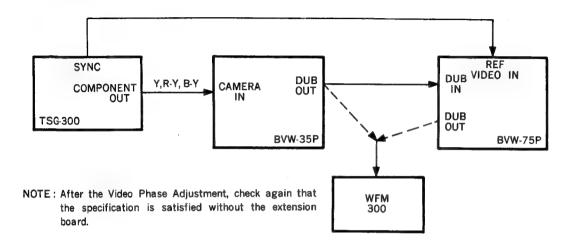
Step 2.

Machine conditions for adjustment	Specifications	Adjustments
 Connect TP19 on the DEC-30 Board (A-2) to GND with a shorting clip. Turn temporarily RV605 on the DEC-30 Board (A-3) fully clockwise direction. VIDEO level: Center clicked position 	Field REF TP18/DEC-30(B-4) OK:	⊘ RV605/DEC-30(A-3)
VIDEO IN: color bar signal	NG:	
• EE mode	Ц Ц	
 Adjust the field signal with an oscilloscope. 		
After the adjustment, remove the shorting clip.	TRIG: SG Field REF	

Step 3.

Machine conditions for adjustment	Specifications	Adjustments
• Turn the SC PHASE control knob on the signal generator, and shift the phase by \pm 80 degrees.	Waveform vector monitor +90°	SH PHASE control knob on the signal generator.
Check the specification in Step 2.		
VIDEO level: Center clicked position	0.	
VIDEO IN: color bar signal		
• EE mode	-90-	
	[SCH mode]	
	When the specification in Step 2. is not sat readjust from Step 2.	isfied,

11-7-4. Video Phase Adjustment



Step 1. BVW-75P Check

Machine conditions for adjustment	Specifications	Adjustments
• Play back the bowtie & 10T signal on the alignment tape CR5-1B PS with a BVW-75P.	DUB OUT connector/BVW-75P B-Y C/C delay 0±5 nsec Y/C delay 0±5 nsec	* When out of specification. C/C delay RV501/TBC-8P(F-1) : BVW-75P Y/C delay Y/C DELAY/sub panel : BVW-75P

Step 2. DUB OUT Y/C Delay Adjustment (EE mode)

Machine conditions for adjustment	Chariffeetiana	
VIDEO SW: CAMERA	DUB OUT connector/WFM-300	ØRV139/ENC-6P(G-1)
• CAMERA IN: BOWTIE(50%) • EE mode	B-Y R-Y	
	Y/C delay 0±20 nsec	

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11-7-5. PB C/C, Y/C Delay Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Play back the bowtie & 10T signal on the alignment tape CR5-1B PS.	C/C delay B-Y Equalize amount of delay	⊘ RV1/EQ-23 [A160] : CEC-3P(E-2)
	O±10 nsec Y/C delay B-Y Q±10 nsec	⊘ RV501/ENC-6P(C-1)

11-7-6. PB Y/C Delay Adjustment (Composite)

Machine conditions for adjustment	Specifications			Adjustments	
 Play back the Y/C delay portion on the alignment tape CR5-1A PS. 	VIDEO OUT	OK	NG Y delay	NG Y advance	⊘ RV507/CEC-3P(B-3)

11-7-7. Video Phase Adjustment (1)

Machine conditions for adjustment	Specifications	Adjustments
 Play back the bowtie & 10T signal on the alignment tape CR5-1B PS with a BVW-75P. 	DUB OUT connector/BVW-75P: WFM-300	SYNC FINE/sub panel : BVW-75P
CAPSTAN LOCK SW/sub panel (BVW-75P): 2FD		
·		
	Coincide the mark in the center with center of the bowtie.	
,	0±5 nsec	

11-7-8. Video Phase Adjustment (2)

Machine conditions for adjustment	Specifications	Adjustments
VIDEO SW: CAMERA CAMERA IN: bowtie signal (50%)	DUB OUT connector/BVW-75P: WFM-300	Metal ORV615/TG-31: MDM-3P(B-2) Oxide ORV616/TG-31: MDM-3P(B-2)
• Connect the DUB OUT con- nector on the BVW-35P to the DUB IN connector on the BVW-75P		
 Insert a BCT-20M (in the Metal mode adjustment)/ BCT- 20K (in the 0xide mode adjustment) cassette tape. 	Coincide the mark in the center with center of the bowtie. 0±5 nsec	
· INPUT SELECT SW/BVW-75P: CTDM		
• EE mode (Both BVW-35P, and BVW- 75P)		

11-7-9. Overall C/C, Y/C Delay Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Step. 1		
· VIDEO SW: CAMERA	·	Metal ⊘ RV1/EQ-23 [A109]
• CAMERA IN: bowtie signal (50 %)	B-Y R-Y	: CEC-3P(F-2
Connect the DUB OUT connector on the BVW-35P to the DUB IN connector on the BVW-75P.		
 Insert a BCT-20M (in the Metal mode adjustment)/BCT- 20K (in the Oxide mode adjustment). 	Equalize amount of the delay 0±20 nsec	
INPUT SELECT SW/BVW-75P:		Metal ⊘ RV617/MDM-3P Oxide
• EE mode (Both BVW-35P and BVW-75P)		ORV618/MDM-3P
	Coincide the mark in the center with center of the bowtie.	
	0±20 nsec	
Step. 2	,	
· VIDEO SW: CAMERA	DUB OUT connector/BVW-35P: WFM-300	
• CAMERA IN : bowtie signal (50 %)	Check that the specification in step 1 is satisfied. When the specification is not satisfied, readjust in	
Insert a BCT-20M/BCT-20K cassette tape.	step 1 within the specified level.	
Play back the self recorded portion.		
Step. 3		A STATE OF THE STA
Play back the recorded cassette tape in step 2 with a	DUB OUT connector/BVW-75P: WFM-300	
BVW-75P.	Check that the specification in step 1 is satisfied. When the specification is not satisfied, readjust in step 1 within the specified level.	

11-7-10. Overall Y/C Delay Adjustment (METAL)

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	VIDEO OUT connector (terminated at 75ohms)	Ø RV617/TG-31 [A102](B-2)
· CAMERA IN; pulse/bar signal		
• Insert a BCT-20M cassette	ок / \	
tape, and put the unit into the self-REC/PB mode.		
	NG	
	chroma advance	
	Turn RV617 slightly counterclockwise direction.	
	NG	
	Chroma delay	
	Turn RV617 slightly clockwise direction.	
• Waveform monitor:	Spec 1.	
LINE SELECTOR OFF	0±20nsec	
• Waveform monitor:	Spec 2. Difference between fields	
LINE SELECTOR 15 LINE	0±30 nsec	
Field: 1+3, 2+4	CH-A: 1+3, CH-B: 2+4	

11-7-11. Overall Y/C Delay Adjustment (OXIDE)

Machine conditions for adjustment	Specifications	Adjustments
· VIDEO SW: CAMERA	VIDEO OUT connector (terminated at 75 ohms)	©RV618/TG-31[A102](B-2)
 CAMERA IN: pulse/bar signal Insert a BCT-20K cassette tape, and put the unit into the self REC/PB mode. 	ОК	
	NG	
	chroma advance	
	Turn RV618 slightly counterclockwise direction.	
·	NG chroma delay	
	Turn RV618 slightly clockwise direction.	
· Waverform monitor:	Spec 1.	
LINE SELECTOR OFF	0±20 nsec	
Waveform monitor:	Spec 2. Difference between fields	
LINE SELECTOR 15 LINE	0±30 nsec	
Field: 1+3, 2+4	CH-A: 1+3, CH-B: 2+4	

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